MAGAZINE

Airborne

NUMBER 107
Sept. - Oct. 1991
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New South Wales A Class skippers concentrating on the action, while one of the locals studies their form.

Don Bekins releases his 60 inch span Clipper for its maiden flight at Napa, April '91. Has O&R 23 FRV and flew - like a Clipper! Photo by Ed Hamber via Bruce Abell.

Brian Douglas' big Fokker. What's the story behind the Aussie colours, Brian? Lovely day in Kiwiland.

Breakers in Poverty Bay near Gisborne on the NE corner of New Zealand, taken by Bob Main from his camera-carrying model. Who would not like to change places with a model aircraft in the sky? Photo from Bill Cooksey.

John Sims' ten foot span, scratch built Pilatus Porter displayed by his wife, Lannah. Fuselage and wings are covered with 0.6 mm ply. Weight is 19 lb; that's 8.63 kg. Rudder, elevators and ailerons are counterbalanced. Colour scheme is Mt. Cook Airlines. Flys like a trainer, John says.

MAGAZINE

Airborne

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The Editor, RMB 1798, Benalla, Vic., 3673.

Payment must be negotiated with the General Manager.

DEADLINES:

Issue No. 108 6 Sept. 1991
Issue No. 109 1 Nov. 1991

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COVER STORY

This Skybolt Long EX was built by Craig Woodhead from a much modified SIG kit. The model is powered by and OS 61 and controlled by a Futaba Radio. Impeccably painted in lacquer and finished in clear urethane, all trim is hand finished without the addition of decals or stick-ons. The Skybolt was photographed with Regan Hyde of the Gold Coast by Kevin Poulter Studios - Melbourne.

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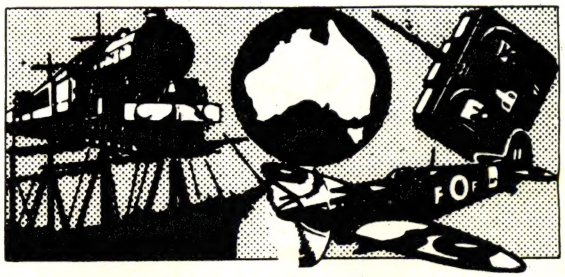

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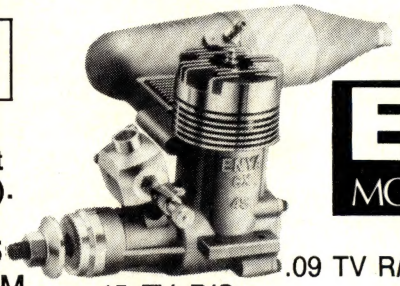

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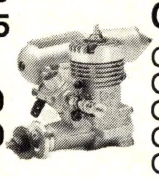

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From the Cockpit

DO WE NEED A MUSEUM

The establishment of the Academy of Model Aeronautics by the US aeromodellers many years ago brought into focus the much debated issue of recording the history of aeromodelling from the early years of this century. Our own history surely starts with Hargreaves at Stanwell Park before Federation.

The MAAA Council is willing to establish our own museum, and has a sub-committee working on a detailed proposal, but the project will always be restricted by the cost. Since aeromodelling is a self-help organisation we have to find the resources from within our own ranks, and can only hope for financial support from outside.

History provides tha basis for growth. This is explained by Fred Lehmberg in the AMA Publication, Cloud 9, Vol. 6, No. 6:

"Museums and literature ... have kept all the Great People and Notable Events of Aviation alive in the minds of not only aviation buffs but many a pedestrian you pass on the street.

Modern magazines publish an occasional nostalgia piece - John Pond has a remarkable column in Model Builder where he touches on things that happened many years ago in every issue. Model Airplane News' Hal de Bolt covers the RC scene of the '50s very well. Model Aviation has published a number of articles over recent years. But this is not enough.

There are several mail order sources for a tremendous number of titles on aviation. Zenith Aviation Books is one of the largest, and my copy of their catalogue has only seven titles on Model Aviation, all on construction and aerodynamics, none on the historical development of its craft and personalities in its development. The AMA Museum is the best source for the few books on these subjects; the yearbooks of Frank Zaic being exceptional gems covering the years from the early '30s to the late '60s.

Speaking of yearbooks, I am reading one by an Aussie, Merv Buckmaster, Aeromodelling Digest 1990 (RMB 1798, Benalla, 3673, Aust). that is perhaps the best of its type that I have ever seen, containing material written half a century ago and perpetuating hobby names, places, designs and events through the years past to the present. We need books such as this one describing the present and past decades on the American Scene if our modelling exploits are to be remembered!

Museums? The AMA Museum is without doubt the best museum in the world having only aeromodelling exhibits on public display. With its planned increased facilities, these displays will be available to a wider public. This activity of the Academy of Model Aeronautics brings prestige to not only the Academy, but to the entire hobby of aeromodelling. However, like a garden, it must be tended and nutured and pruned if it is to endure.

So, what is 'enough' to maintain and increase the growth of our hobby? The Academy of Model Aeronautics had long been its guiding influence and lobby in Washington. The Academy is resting on a secure and solid foundation. The Museum and Library are becoming a valuable part of that institution, and it is in that direction that we should concentrate our individual efforts. Cloud 9 is the museum newsletter, of course, and is always happy to receive material for the Museum Library. Membership for more Museum Patrons should be encouraged, perhaps solicited is a better word, by all its members. A large membership would not only ensure the maintenance and growth of the museum, but strongly assist in providing an on-going supply of personnel and funding for the perpetuation of Model Aviation History for the decades to come."

This long range view will not be supported by all modellers; indeed, we all have the choice and, in this country, the freedom to express it. However, it is up to the true supporters of our great sport to make their views known. Those who do not give active support will still gain, but without enough help we will all be losers.

DISCOUNT GIVE-AWAY

This is not a sale, but a genuine free offer. The Editor is clearing out some books about aeronautical subjects of many sorts, and would like to find appreciative recipients for them. That's simple enough, but there is a catch. The offer is being made to juniors only, and for any junior to qualify for a free book he or she must send in a photo of his or her model aircraft together with a few notes about the model and the pilot. If the photo is good enough it will appear in the magazine. I hope to get so many photos that I won't be able to keep track of them all and tell who sends more that one! Each photo will be returned with a book, whether or not the photo is published. Where do you send your photo? The Editor, RMB 1798, Benalla, Vic., 3673.

NOT INDIGESTIBLE

We had high hopes that the new Digest would provide enjoyable reading for modellers with a wide variety of interests. Early comments seem to have vindicated this general approach. Digest 1991 is better than Digest 1990, if only because of the sorting out experience with the first one.

Ken Pountney's anticipation was fulfilled:

"If it's half as good as the 1990 issue, I'll be waiting for the 1992 issue as well," he wrote. He enjoyed the range of subjects covered in the book. Here are some more comments:

"Hearty congratulations to you both for the remarkable quality product of yours, the 1991 Digest." David Gregory.

"You and Joan have again assembled an excellent mix of reminiscences, nostalgic construction articles, technical articles and state-of-the-art data, all of which will be re-read with pleasure from time to time." David Owen.

"It costs about the same as 3 copies of the American magazines, but has far more reading matter. Exceptionally good value." Ivor F.

"I enjoyed the first issue very much, and look forward to receiving my copy of this year's edition. Your efforts are much appreciated, thank you." W. Summerton.

There are no advertisements in the Digests (which are both still available; see advertisement this issue), so they will not date as magazines do, and there are points that can be appreciated by all aeromodellers, from beginners to specialists. Production of a further issue for Ken Pountney, and others, depends on your support. With it we think that you will be the winners.

CONTACT ....

.... Port Pirie MAC through Trevor Hurst, Box 326, Port Pirie, 5840; phone (086) 34 3056. Club President is Bob Steer. How's it going over there guys? Floods or drought?!

Alan Jackson of Holdfast Club at the Constellation Club Scale Day in May. His Taube has a Saito 4-stroke and antique Solartex covering. A great model of a quaint aeroplane. Don Howie took the photo.

How to hover quietly. Graeme Reynold's Concept 30 with OS 28H and Bolly EQ 33H pipe. Purrs at 86 dBA at 3 metres. Which prop is the Bolly?

CUTTING COSTS

No need to increase your overdraft to keep on modelling. Build a scale model in spite of the recession from a kit from Peter van Meurs, Box 517, North Geelong, 3215. Kits vary from 1/144 to 1/8 scale. Price list has details. Just the thing for a winter evening.

MISSING DATA

In the 1991 Aeromodelling Digest, on page 95, the plan of Ivars Dislers' super FAI speed model, Ruski Mk1, is shown. Underneath is the price, $11, but not the source, which is Ropomod Production, PO Box 30, Tullamarine, 3043. The plan purchase includes a separate sheet of fuel tank and shut-off design details. It seems that all the other 16 plans in the book have the address as well as the price given, so what happened in the case of Ruski Mk1? Murph! Are you there, Murphy ...?

SHARING

Many contributions to Airborne are not given the space they may deserve in a monthly magazine. It is not that your Editor is not as keen as the contributor about the particular material, it is just that there is not enough space. I have always used one photo of two different models rather than 2 photos of the same model, and I try not to use photos of models that have appeared before. It is difficult to be as keen about Pattern as Pylon, as Scale, as Glider, as Old Timers, as Helicopters, as Ducted Fans, as Electric, as Control Line or as Indoor as any of the experts in each of these disciplines. I thank the columnists for taking that responsibility. They are always pleased to hear your news and may use it in their column. Want their addresses?

Engin-ear; Brian Winch,
33 Hillview Parade, Lurnea, 2170.

Old Timer; Colin Borthwick,
52 Chapel Hill Road, Chapel Hill, 4069.

Silent Wings; Bruce Abell,
17 Ferguson Street, Cessnock, 2325.

Pylon; John Hughan,
92 Hawthory Road, Kilsyth, 3137.

Helicopter; Max Tandy,
9 Smailes Road, Jimboomba, 4280.

Yachts; Iain Kirley,
RMB 431 Mack's Reef Road,
via Bungendore, 2621.

Electrics; Phil Stevenson,
6 Crown Street, Henley, 2111.

Ducted Fans; Russell Weir,
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Juniors, please send your letters to me at RMB 1798, Benalla, 3673.

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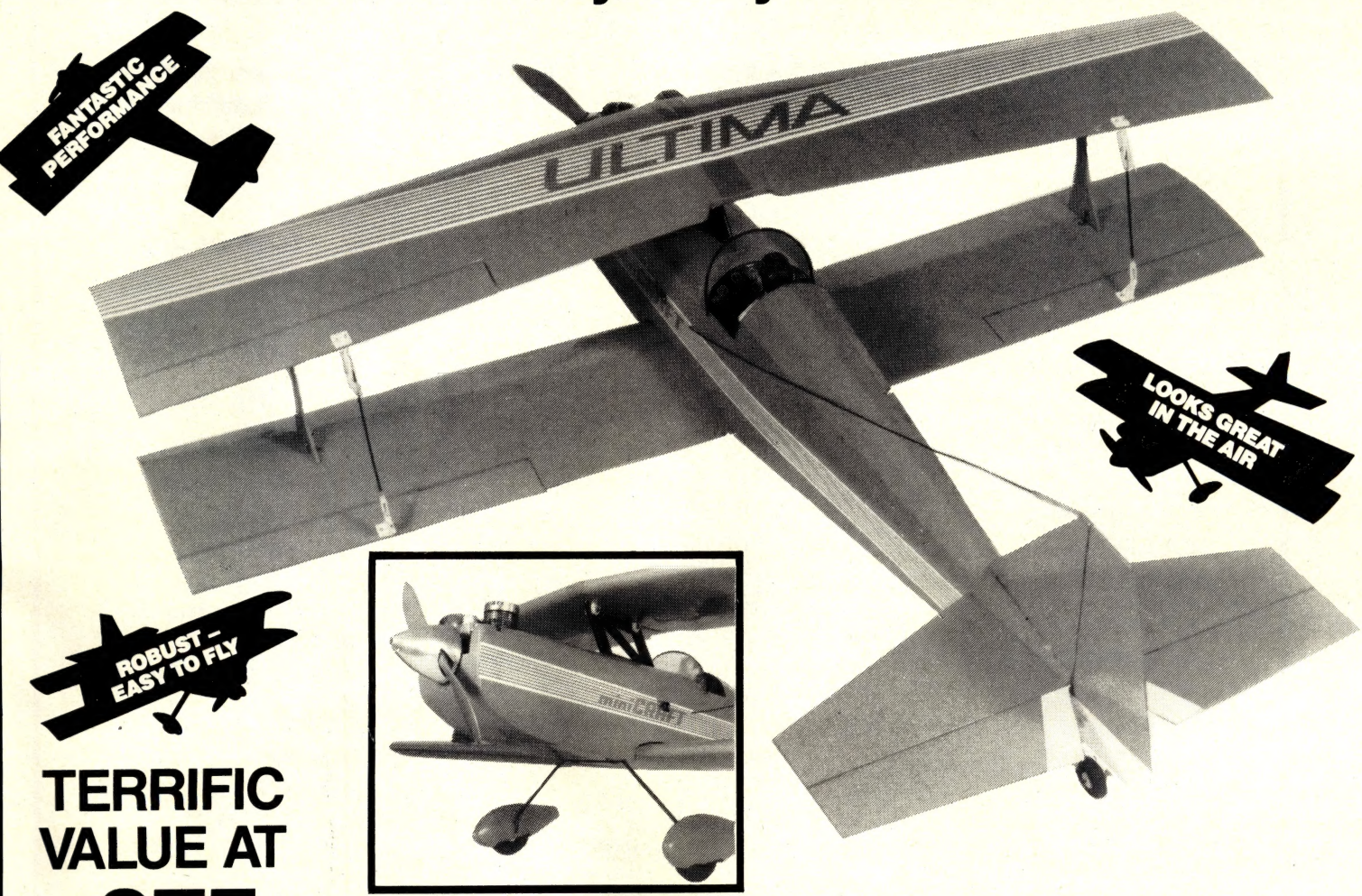

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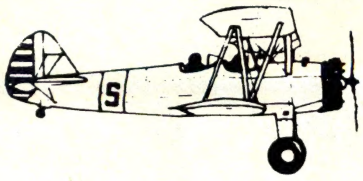

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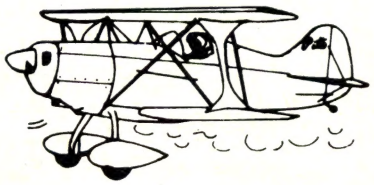

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Letters to the Editor

Dear Sir,

I am a sixteen year old junior modeller. I read Airborne regularly, and I especially like your product reviews — they help me to decide what I would like to buy in the future. Thank you for such an informative magazine; it's well worth the cost.

I started flying RC gliders about two years ago and joined VARMS. My first model was an Aeroflyte Aries - it had the added attraction of coming with a two channel radio. My next model was a Brolga. After I had crashed that enough I thought I might try flying electric models. The Electra looked like a nice model to me so I bought it. Later on in the year I flew it at the National Electric Flight Rally at Wangaratta. Even after seeing all the other competitors' sophisticated equipment I still felt competitive. I was wrong - my model flew a bit like a house brick. David Hobby was kind enough to lend me one of his motors. It had heaps more torque than the motor supplied in the Electra kit. I have since bought a fairly expensive Losi Super Stock motor. I'll use it next Easter at the Rally. After the Electra came my first 'power' plane (as glider freaks would phrase it!). It was a Freedom 20. I bought a Leo 28 engine and a few other bits and pieces and got it flying. The Freedom 20 was a bit heavy so it took up a lot of runway to get flying. There was also a slight warp in the tail fin which made a straight take-off almost impossible. The model would swerve left and right while taking off - even with aileron and rudder compensation. About two weeks ago the Freedom had a nasty accident. Let's just say that I am building a Scorpio Safari 2000 at present.

My newest glider is a Sophisticated Lady. She flew beautifully until my friend crashed her. (She has since been sent back to the building board.)

Well, there you have it. A short but sweet modelling career. If you would like to know, I use a JR four channel radio for my power plane and a Sanwa Dash with a nicad conversion for the gliders.

Yours faithfully,

Tim Carter, Heathmont, Victoria.

Once again the Editor takes something from his Goodies-To-Encourage-Juniors box, this time for Tim Carter.

Freedom 20 with Leo 28, by Tim Carter. Needed lots of runway to get airborne!

Andrew Row, a junior member of the Burnett Miniature Aircraft Inc., with his Windsong, a Bruce Abell (Airborne) plan. Andrew is doing well in contests. He also flys a Trenton Terror and is experimenting in free flight. Thanks to Jan Fielding for the photo. Andrew will receive something from the Editor's Junior Encouragement Box of Goodies to keep up his interest in an aeronautical engineering career.

Dear Bruce,

Firstly, let me congratulate you on the continuing high standard that you provide your readers in your column. On Silent Wings is the primary reason that I purchase the magazine, and I look forward to each issue. Now for the BUT!! You only gave minimal mention to the scale event that happened at Waikerie in March; I quote " ... Winners were the same as last year". This event is the biggest scale glider contest in Australia, and I have it on reasonable authority that it may be the biggest scale thermal glider event in the world!!! You go on in the body of the column " ... Surely there must be more scale gliders around?" Yes, I think there are, and they were not all at Waikerie, although we had over 50 scale gliders this year.

Next year the event will run on the same (Moomba) weekend, and we hope that Airborne will support and encourage a big contingent from NSW. If you are building a scale model we would love to see you.

For those of you who have not seen aero towing of scale gliders on a large scale, it is an educational experience. We had only 2.5 tugs running this year (one had motor problems) and we could still managed to put one glider up every 3 minutes during the round. As this is a thermal event we had to launch every competitor to the same height, be it winch or aero tow, so the tug plane had height measuring devices that told us when the tow plane had got to the required height. To see 8 or 10 scale gliders in one thermal is a fantastic sight, and one that is good to think about during the cold winter months.

If you can generate interest in NSW we can accommodate quite a large number in the dorms on the field. The Vics hire a midi bus, hook a full size glider trailer on the back and stuff it full of scale gliders and set off for the ten hour trip. I do not think that the distance is a big problem. People do it for Jerilderie and the Nats each year, so why can't the scale glider pilots? If the weather is as good as it was on Sunday and Monday you can choose your own thermal from a wide variety.

Yours faithfully,

Ian Moreland, Fairview Park, SA.

Thanks Ian. Get all your flying buddies to buy the magazine so that less space has to be given to advertising and more space is available for OSW.

Dear Sir,

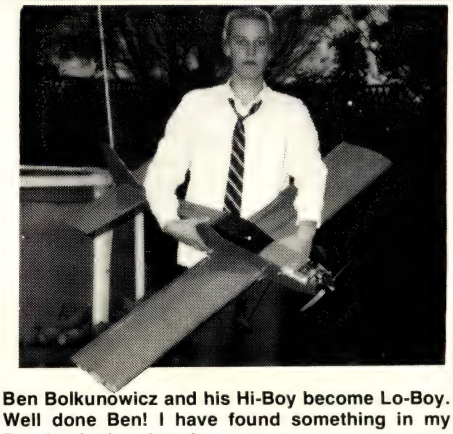
I am another of those people you call 'Junior Modellers'. I started flying when I was 16, and my first plane was a Precedent Hi-Boy with an OS 40 FP. Rather than buying a low wing sport-trainer, I decided to convert my trainer into a low wing and taildragger!

Being a member of MARCS club, I am disappointed to learn about the possible loss of our field due to the discovery of prehistoric weed in the area. (No, I haven't seen any dinosaurs!) It's a shame, as it is an excellent flying field and close to where I live.

Yours faithfully,

Ben Bolkunowicz, West Sunshine, Victoria.

The MARCS use only 0.4• of the area where the weed is found. Re-zoning will probably turn it into factory sites eventually!



Ben Bolkunowicz and his Hi-Boy become Lo-Boy. Well done Ben! I have found something in my For the Juniors box for you.

Dear Sir,

I was pleased to read Bernard Ruben's letter in No. 106 calling attention to my clanger regarding the initials MSDS in my article The Real Dope in No. 104. The error arose through my on-the-job advice to painters in the Canberra region, which often included a hammering to get on to the manufacturer if there was any doubt as to the health hazard of a product. The needle got stuck in the groove! Of course MSDS stands for Material Specification Data Sheet, and the format is discussed in detail in the Painters' and Decorators' Handbook published by the Operative Painters' and Decorators' Union. This back-pocket-sized book was written by the union's Health and Safety Officer in collaboration with a group of us having specialist knowledge of surface coatings and their associated raw materials. As far as we know, it is a world first in its class, and it is a worthwhile addition to the reference books for all users and makers of paints, lacquers and varnishes, particularly at the backyard level. Funding for the project came from the unions together with grants from Worksafe Australia and the Industry and Community Grant Scheme. Copies can be obtained from eiher the OPDU or the Federation of Master Painters and Signwriters Association. There are offices in all states except the NT, so don't put it off.

Bernard's letter gives me the opportunity to comment about my request in The Real Dope for any users of nitropropane to make contact, the reason being that this potential fuel additive is both carcinogenic and destructive to internal organs. No-one has written to me, so I conclude that if any adventurous aeromodeller is using nitropropane he is aware of the hazard and lying low!

Chris Schofield with his own design Something Else. Usually there is a Schofield-made engine to provide the power. See some of the magnificent Schofield engines in Aeromodelling Digest 1991. This photo from Les Bollenhagen.

In conclusion we can say that the attitude of aeromodellers to the materials they use has changed dramatically in the last few years. We must certainly thank Airborne for its contribution to this welcome change. However, my gripe is that some of us are still careless in safeguarding the eyes from retinal damage from ultra-violet light. This was discussed in No. 97 (Holes in the Ozone Layer, Blue Skies and Ultra Violet Light), but doesn't seem to have registered with a few. You can smell a solvent or a glue and the penny can drop and jog the memory, but there is no sense to warn you of harmful radiation from the sky. Be warned once again!

Yours faithfully,

Len Williamson, Canberra.

On a sunny day, take off those shades only when your photo is being taken!

Dear Sir

Here is an amendment to my review of the Futaba FP7 which appeared in Airborne No. 105. The mistake arose because I misunderstood the operator's manual. As I said in the article, it is difficult to understand in places and this is a complex radio. I hope the error did not cause any inconvenience.

The original read:

"The system also has a four model memory that incorporates the ability to copy data about one model into another memory. Each memory can also be reset back to the factory settings. The only flaw with this system, as I see it, is the inability to use the different model mixing types (heli-plane-glider) simultaneously, because when you change the Mixing Type menu you also reset any data you programmed in previously. I get around this problem by just switching out the unwanted functions."

The amendment is to read:

"The system also has a four model memory, each of which can be set up for any of the mixing types (heli-plane-glider). Be warned though that when you change the Aircraft Mixing Type menu you will also reset any data you previously programmed in to that particular memory. There is also the option of copying data from one model memory into another and/or resetting the memory back to its factory settings."

Some more information of interest about the radio has come to light since I wrote the article, though it does not necessitate any changes. I have discovered that the only difference between the aircraft and helicopter versions of this radio, aside from the labels on the switches, is that the helicopter set has an invert facility and the aircraft set has a snap roll switch. Also, though I have not attempted it, I have found no reason why the radio could not be configured for switchless inverted flying; I am still looking into the details.

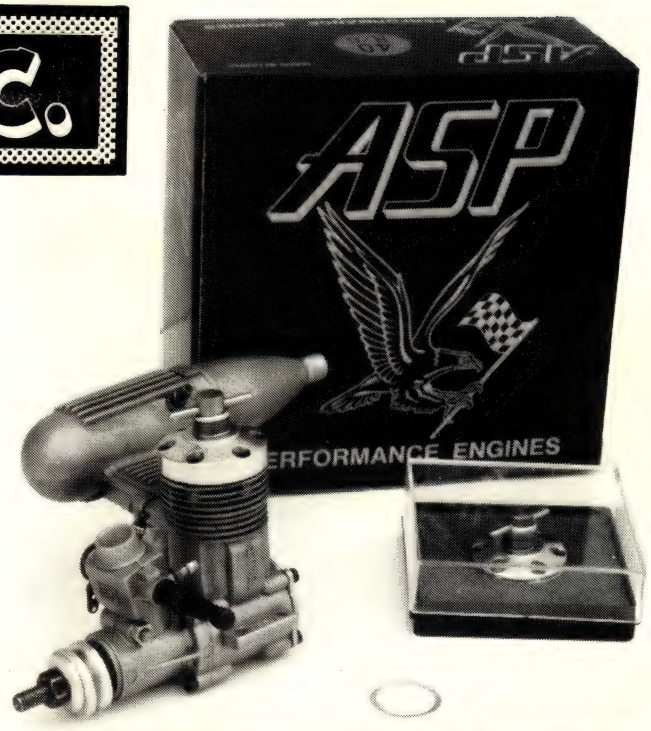
Yours faithfully,

Jason Milner, Greensborough, Vic.

Focus on R.C.

ENGINE REPORT

THE ASP DIESEL CONVERSIONS



New diesel conversion heads for ASP 40 and ASP 32. Head in plastic case, right, is included with complete glo motor, in eagle-adorned box, behind. Note spring on compression screw, aluminium gasket for adjusting deck height.

The prototype ASP 46 Diesel was reported in Airborne No. 106. For a new design, the special diesel head on an otherwise standard glo motor was a remarkable success. Diesel conversions of the ASP 40 and ASP 32 are now becoming available, and may be obtained from hobby shops that carry ASP engines. The new diesel heads are available together with a complete glo motor, so the purchaser has the option of using diesel or glo version, since the conversion involves only the change over of the head itself.

The diesel head is machined to a very fine tolerance and fits as well as the glo head. Aluminium shims are provided to enable adjustment of the change-over head. For best performance the diesel should run with the contra piston almost flush with the squish band. To determine the correct position the head is removed and examined after the running compression setting has been determined. If the contra piston is more than 0.5 mm above the squish band surface, an extra gasket is required. If the contra piston projects below the squish band, a gasket should be removed. This is a very simple operation to perform.

It may take a little effort to find the running settings for the diesel version. It is poor technique to flood a diesel as the compression has to be backed off a long way to avoid hydraulic lock. So the process of getting the correct compression is best done slowly. A few brief bursts will indicate that the best setting is close. The response of the engine will improve by setting the throttle at about 60% open.

The fuel should be 20 to 25% castor oil and 30 to 35% ether, leaving 40 to 50% for kerosene; plenty of the power component of the fuel for good economy. An ignition improver is needed for normal running. and 1% seems to be sufficient.

The ASP 40 diesel soon settled down to running like the ASP 46 D tested previously. The exhaust note has a hard sound compared with the glo version, and power was impressive. On a 10 x 6 it reached 12,800 rpm, which is only a little below the figure for the 46. Fuel economy for a 40 was about 40% better than the glo version.

The 40 diesel was a bit reluctant to start if it was too wet, and it seemed to be easy to get too much fuel initially if the throttle was choked as much as needed by the glo plug version. Lowering the compression to start when too wet avoided any problem, but the compression screw has a very good, tight fit and getting back to the running setting with fingers close to the prop was a little scarey, naturally. The point is to avoid too much fuel prime.

Diesel engineers will enjoy these ASP conversions. Glo engineers should be curious about this new breed of Schnuerle-ported racing diesels. They put a new meaning into the P of ASP.

They are distributed by the Australian Model Aerodrome.

AN ENCOURAGING START

This letter shows that things can go right for a new RC pilot.

Dear Sir,

I am 16 years of age and live on 20 acres about 15 minutes from Canberra. I am referring to a letter I saw in Airborne No. 103 asking Juniors to share their experiences with newcomers to the hobby. Well, for me it all started in December 1988 when I bought two issues of Airborne to read. I was interested in helicopters at first but realised how costly these can be.

After finishing the magazines I went to the local hobby shop and found out about the flying fields in Canberra. There are three, but I was interested in CMAC (Canberra Model Aircraft Club). I went out there one weekend and watched for a while then went home. The following weekend I went out there again and talked to a few people and told them that I was interested. They were friendly and helpful.

I decided to buy a Futaba 5 channel radio with 4 servos (second-hand from someone at the club). I got it that day and with the radio came an old Hustler which was hanging from the roof. When I got it home I was pleased with what I had bought and sat it on my bed. During that week I got my engine, a Magnum 40, from Castle Hill Hobbies, and the rest of the gear from Canberra. Now with the engine and radio installed I was ready to go.

By this time it was April 30th, 1989. I arrived at the club and a CMAC member ran my engine in for me. After this was done another member checked out my model. I had a few minor problems but it could still fly that day. We started the engine and carried it out onto the runway, ran it up then took off. It was climbing beautifully until it descended straight for the ground. On inspection of the model we found that there was not much damage so I was happy. That week I fixed it and I was out there ready to go again the next weekend.

I got there early and someone else flew it for me. I started my engine and carried it to the runway where I set it down. The first attempt at take-off had to be aborted because it was swinging, but when the second was attempted it cartwheeled. The only thing broken was the tail but it was soon repaired, ready to go once again.

This time the take-off was beautiful and I was amazed to see it flying. I flew it and enjoyed it. I went out every weekend following and had a good, damage-free record until May 21st, 1989, when on the last flight of the day the engine stalled on take-off and the undercarriage broke off. Mending was no hassles.

That week I ordered a set of aileron wings which were ready to go in a few weeks. These were really good and my next achievement came on June 3rd when I took off. A few weeks later I was coming in for a landing when a gusty crosswind caught my model and tipped it over in the

long grass. Now the tail had lots of cracks so it was time to re-do the whole aircraft. A big mistake.

First I painted it with about 5 cans of paint and fibreglassed the tail. It was now about 1 kg too heavy (also tail heavy). This was not known by my instructor for the day, and it did not fly well. I got my Mum to build a new tail, then it was fine. With a different instructor again it flew nicely and we landed for the last flight of the day. My instructor decided to go up for one more flight (bad move) and during this flight it went from 300 ft to 2 ft underground in about 5 seconds. On arrival at the crash site we found out that the battery clip had come undone. The Hustler was now dead!

I had a rest for a little while and got an Aries glider for Christmas all ready to fly with an 049 on top. It went well and I enjoyed flying it. My next goal was to go in a gliding competition. I did this and went rather well. I decided to go in another competition but on my second flight a wing gave up on the towline and that was the end of it. I used a friend's glider for the rest of the competition. I was not unhappy after the competition because I was given a damaged glider to repair and keep. It was a Reiher 2500 with plug-in wings.

I repaired it in about one hour and took it up to the oval to test fly it. It was really nice. A few weeks later I purchased a new trainer, a Telemaster 1800. I found it easy to build and finished it in about 3 weeks. I ended up placing servos in the wing to correct the mechanical slack caused by the bellcranks.

In the weeks that I was building my trainer I took my glider up to the oval for some practice. One afternoon I was not so lucky because I wiped the wing out after colliding with a metal rubbish bin. I repaired the wing one day before the gliding competition at Goulburn. I was going really well until the wind picked up and my model was getting blown away and could not be seen, resulting in a crash on the edge of the highway. The competition was stopped because of the wind and I came third out of 24 people. My glider was totalled.

Well, back to my trainer. First flight was beautiful and I was flying really well. My instructor asked me to land and I was nervous but did it successfully. The next day I went out by myself and took off and landed safely. I was now SOLO.

During my times with RC models I built a small CL model and flew it and then a nice flying wing (CL) which has not been flown as yet. I have built a Playboy Cabin from scratch which hasn't been flown either. My Telemaster 1800 has only had 3 minor prangs in 6 months of flying. These were a damaged wing as a result of hitting a barrier fence. I used sticky tape to repair it on the day and flew it again. Next I tore the wheels off in a steep landing, and I broke the nose off in a steep landing which resulted in a cart-wheel. I have repaired it and now I am doing loops, rolls and flying inverted! It's all good fun.

I am planning on getting a low wing sports model some time in the future. One of my friends has a small trainer which he does not fly much because of financial problems and schoolwork. Also he has built from scratch a rare scale Trivial Persuit (?) and also an Old Timer like mine. Another one of my friends who flys CL has got a small model, motor, radio, etc. for only $300. He is really keen to fly it and I will start teaching him in two weeks. My dad is also getting a model (one day).

Craig Skeers and his Telemaster 1800. A good training aeroplane when an instructor is available.

For any newcomers out there, here is some useful advice. First see your local model shop about purchasing an aircraft. Second, JOIN A CLUB. Never try and fly it yourself. Thirdly, talk to the experienced modellers if you need anything. Fourth, I hope you get as much fun and enjoyment out of this hobby as I have in the short two years I have been involved in it.

Yours faithfully,

Craig Skeers, Queanbeyan, NSW.

Craig has received something from the Editor for this excellent contribution.

The 120 Rule

by Stuart Sherlock, RCAS Noise Adviser

Bill Britcher with 75% Dallaire. Has OS Type 6 engine. Note large prop needed to reduce vibration. Probably within limits of the 120 rule. Wings covered with Fibafilm, fuselage covered with doped Litespan. New coverings from Solarfilm company are becoming popular. Don Howie with camera at Sanderson field.

Propeller noise has, in recent times, attracted the attention of modellers seeking to reduce the noise levels of their aircraft. But the subject is complex, and a list of the problems is not out of context here.

- Is propeller noise comparable to exhaust noise?
- Do raked propeller tips reduce noise?
- Are multi-bladed props quieter?
- Can laminar-flow, supercritical airfoil sections reduce noise?
- Are there any special tricks which can make propeller noise disappear?

All very interesting, but the question remains:

- How can I make propeller noise negligible on my model?

Despite the complexities, there exists, in fact, a simple and reliable rule which solves this problem. Originating with CL stunt flyers in the USA, this is 'The 120 Rule'.

To apply the rule, multiply the propeller diameter (in inches) by the rpm (in thousands). The aim is to have a result less than 120. For example, a Rossi 15 in an F1C power model turns a 7 x 3¾ propeller at 28,000 rpm. The product of 7 and 28 is 196. This is grossly in excess of 120, and the propeller noise is appalling. On the other hand, an Enya 120 4-stroke turns a Supercool 14 x 13 at 8,200 rpm. The product of 14 and 8.2 is 115; being less than 120, the noise is bearable.

Thus, for a product less than 120 the propeller is relatively quiet; above 130 it is very noisy; and between 120 and 130 things could be improved.

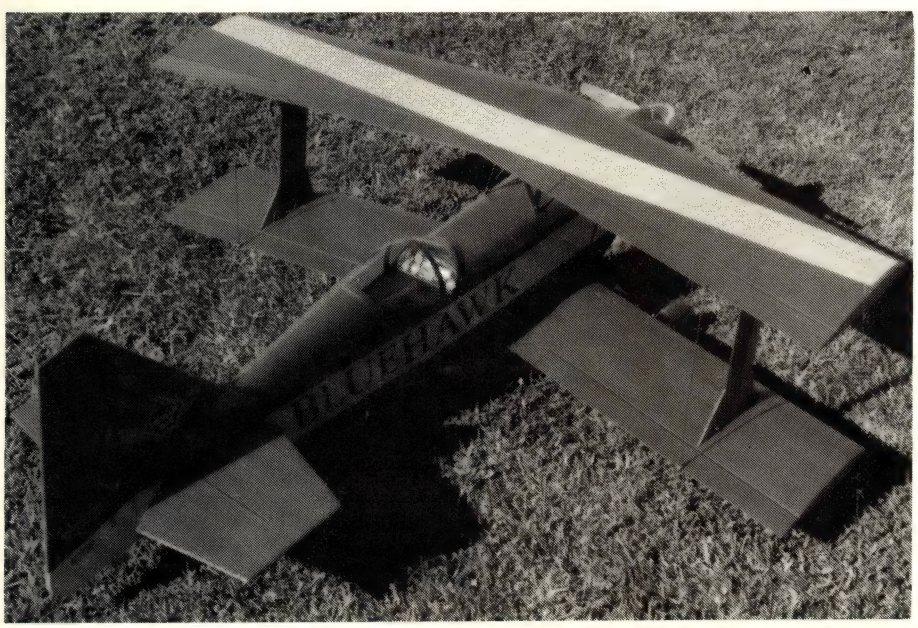
Now, this simple rule seems to be too good to be true. Is it really universal? What about all those complexities which can affect propeller noise?

- What about exhaust noise? One problem with propeller noise is that it cannot be distinguished from exhaust noise. It has only been with the introduction of super-quiet Bolly and Hattori mufflers that clear evidence of propeller noise became available. These mufflers virtually eliminate exhaust noise, so that which remains is propeller noise. When the product is greater than 120, even commercial mufflers reduce exhaust noise below propeller noise.
- What about raked tips? Solid evidence is not available here, just the observation of reliable experts. Most likely, if the product is between 120 and 130, raked tips can assist.
- Multi-bladed propellers? This is a can of worms. On full size aircraft, multi-blades are quieter, but on models there is a problem due to high drag rise for Reynolds numbers below 150,000. To obtain the same power absorption, multi-blades generally have a reduced chord. This drops the Reynolds number, drag rises and the chord must be reduced still further. Thus, efficiency can be a serious problem.
- Laminar-flow, supercritical sections? These sections were introduced to raise the critical Mach number which is typically 0.7. But the 120 Rule corresponds to a tip speed of only Mach .45. In fact, the 120 Rule suggests that the dominant source of propeller noise is the dynamic pressure at the stagnation point along the propeller tip leading edge. Thus fancy tip sections may be useful, but this is yet to be established.
- How about a few tricks? Well, you can't put a muffler on a propeller, so what is left to do?

One trick is to rubber-mount the propeller. This prevents engine vibration being transmitted into, and radiated by, the propeller. The effect is worth less than 1 dBA at 90 dBA.

Another trick is to smear out the sound reaching the observer. This is the reason for using highly swept, scimitar-shaped blades. Noise is considered to be radiated at right angles from the propeller leading edge. On a straight blade there is an instant when all the leading edge is pointed at the observer, giving a concentrated pulse of sound. With a scimitar blade this is never the case, so the sound is smeared out to a lower intensity. This trick has been applied to the Supercool Unducted Fan 12 x 12, 13 x 13 and 14 x 13 props, but the 120 Rule still applies.

For one last trick, what about changing the quality of the sound? Propeller noise is comprised of pure tones superimposed on a broad band of frequencies. The higher the rpm the



A Carl Goldberg Ultimate Bipe by Arthur Withy of SA. Has Super Tigre S90 2-stroke providing enough power for knife-edge loops! Doped finish followed by acrylic paint. Howie photo. How would this fast and furious flyer measure up to the 120 rule?

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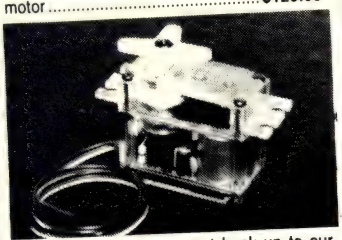

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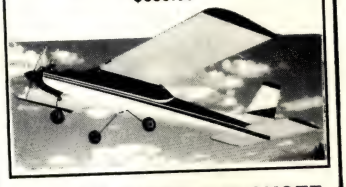

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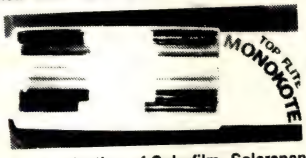

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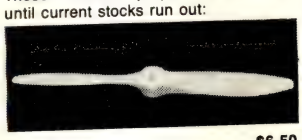

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12 x 12, 12 x 12N, 12 x 13, 12 x 13N, 12 x 14,
13 x 9, 13 x 10
13.5 x 12.5, 13.5 x 14, 14 x 8, 14 x 10, 14 x 12, 14 x 14.
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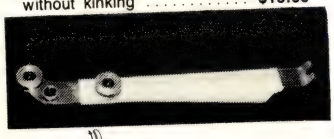

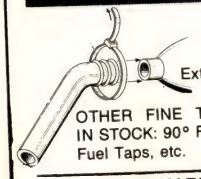

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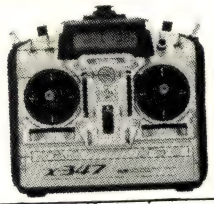

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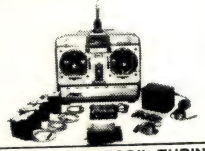

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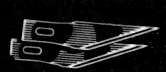

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more the pure tones rise above the general roar of the propeller airflow. The set of tones (or harmonics) generate, to put it mildly, a somewhat atonal chord. This is why the residents of your local encroaching building estate get so upset with your fun. The pure tones arise because the propeller noise is periodic, a result of rotation. If this periodicity could be altered then so would the quality of the sound. This is the case with car tyres, where the tread is unevenly spaced. Thus, by setting a 4-bladed propeller with a 70° included angle (instead of 90°), some modification of the noise quality should occur. This trick is being tested at the present time.

So what does the 120 Rule imply for the design of future engines and propellers? A current American study suggests that reduced diameter and increased pitch is effective in reducing noise. This certainly works, but vertical performance and acceleration suffer. This method arose because the experimenters were cutting down existing propellers and thus could not increase chord or optimise induced losses.

A better solution is to reduce diameter and increase chord. A correctly designed minimum induced loss propeller need only lose 3% efficiency for a 20% reduction in diameter. Vertical performance may be further enhanced using non-helical pitch distributions.

Engines must also change. The now universal Schnuerle porting has led to higher rpm, and this is a disaster from the noise point of view. A replacement is required for the current generation of sport 40s.

Consider a long-stroke, cross-flow 60 with a short blow-down period. Required to develop only the power of a 40, such a motor could be built to weigh only 220 gram. With a short exhaust period, such a motor would develop maximum power below 9,000 rpm, and possess good handling characteristics.

Combining this engine with a low diameter, broad chord propeller and multi-stage expansion chamber muffler, the noise level would easily drop below 85 dBA with no loss in performance over the current sport 40s.

Gordon Burford, are you listening?

Would Gordon's Freedom propeller design cover some of the design features described above?

PAGES FROM THE FUTURE ....
Modellers Finally Tackle Noise Problem

Aeromodeller for July 1995 has published the following account of the progress made by the hobby under the Noise Abatement Convention, which was adopted by the United Nations Commission for the Environment in June 1994, and which is binding on all member nations. It will be recalled that the increasing noise and air pollution in the world's Western cities through 1993 led to a world-wide mass migration of city dwellers into the countryside, where thousands of seekers of peace and pollution-free air built homes on small land areas, usually under 10 hectares. This wasteful use of productive land, with its catastrophic impact on the world food supply, led to the Moscow Conference in late 1993 and, ultimately, to the adoption of the Noise Abatement Convention. The Aeromodeller article begins:

"The sudden imposition of a world-wide ban on all model aircraft powered by internal combustion engines with a noise level in excess of 50 dBA in July 1994 came as a great shock to the world's aeromodelling community. Many had believed that the fact that all models (apart from FAI F1C) complied with the 1991 86 dBA level stipulated by the FAI would mean that model flying would be relatively unaffected by the convention.

Engine manufacturers, through their world-wide Model Engine Manufacturers' Federation, made three attempts through the World Court at The Hague to get the maximum level restored to 86 dBA, but were unsuccessful on each occasion. The judge, in rejecting their final appeal, pointed out that the aeromodelling movement had been aware since 1951 that the noise made by model aircraft engines was unacceptable to most people and had not made any significant reduction in engine noise since the first crude mufflers came into use in the early 1980s.

He went on to quote from an article in Aeromodeller, dated June 1991: 'If you don't realise that aeromodelling is on a seriously slippery slope so far as noise is concerned, you want your brains tested. Honestly, we really are funny fellows. It is ridiculous that Roy Nudds, General Secretary of our national body, should have become the undoubted authority on noise pollution he now, of necessity, is. He had been urging observance of the DoE Noise Code, and spelling out that the law, both statue and civil, is hardening against us. Concurrently, Martin Dilly, in writing of his grave concern, has made a staggering reference to public hostility to aviation in Britain.'

Nice white Tiger Moth to 1:7 scale by David Murrell of Coffs Harbour. Has OS 48 Surpass, weighs 2.5 kg. Rudder pedals and joystick both work. Sig Coverall and scale exhaust. Scale modellers take time to do it in detail.,

The response of the world's engine makers to the ban has been very praiseworthy. The 1995 OS Q4S (Quiet Four-Stroke) was the first engine to record a noise figure of less than 50 dB (actually 46 dB on test), and no doubt others will follow. The cost of the OS research program is not known, but it is believed to be well over $US1 million. The specially designed long-stroke engine is fitted with a low-noise helical gear reduction box, and the matching propeller alone took six months to perfect. The engine even has a 'silencer' on the carburettor, as it was found that this was a significant source of noise once their very efficient 'turbo-flow' muffler had been developed. This technology can be used down to 2.5 cc, which means that F1C can now be flown again, admittedly with a weight penalty, and flyers are learning how to trim contest models using the new high-torque, low-noise engines."

EASILY DIGESTED!

Does the Editor have time to sleep nights? Probably not. What with turning out Australia's number one (and only) aeromodelling magazine, looking after the girls and trying to keep both the modeller and the publisher happy, there cannot be much time for anything else. When his AEROMODELLING DIGEST 1991 arrived, I knew he must be a closet insomniac! The Digest '91 is Merv's latest effort, and follows the success of the first Digest published last year.

Having a respite from writing, Mr. Buckmaster has gathered together 27 good authors (except for the one on page 137), and compiled 36 articles for the latest Digest. This time you get 208 pages, or about 16% more than last time. So much for the statistics. The only statistics inside Digest '91 are a page of new flying records and much more to interest modellers of all disciplines. The new Digest has wider appeal than the last. You don't have to be a long-serving enthusiast to understand and enjoy much of the contents, and there is plenty for the RC'er. For example, a feast of photos and data on no less than 33 of the country's outstanding large scale aircraft. Phil Stevenson has a tabulation of successful electric models, and there is an abundance of Merv's first love (after the girls, of course,) vintage models. I counted 16 model plans, although 9 of these are free flight, leaving 4 for CL and 3 radio models. The nicad memory phenomenon is debunked in Modelling Myths, and I particularly liked the vintage team race article which brought back happy memories for your columnist. Boddington writes about the world's most famous modeller, Hanno Prettner, and that prolific Kiwi author, Maurie Poletti, has a famous NZ model in the 1939 Texaco winner. There's even a competition. See how long it takes you to find Merv's editorial!

As before, the Digest is very nicely presented on good quality paper with plenty of first class photographs. He's not paying me for this free plug, so why should I lie!? Considering the lack of imposition by advertisements (there are none) the price is a bargain at $16. Available only direct from Samaria Concepts [see advert elsewhere]. Go on, reach for the cheque book or credit card and letter writing implements, the Aeromodelling Digest 1991 should be on the bookshelves of anyone who calls himself a modeller. Sleep well now, Merv.

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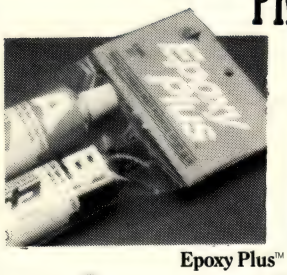

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6 Oz. (No. 790)

Instant Jet™

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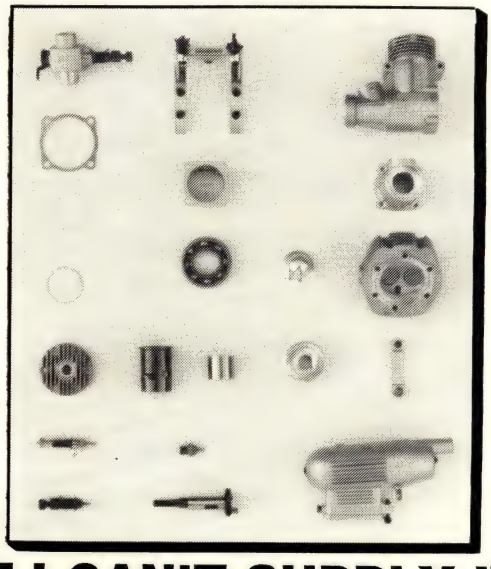

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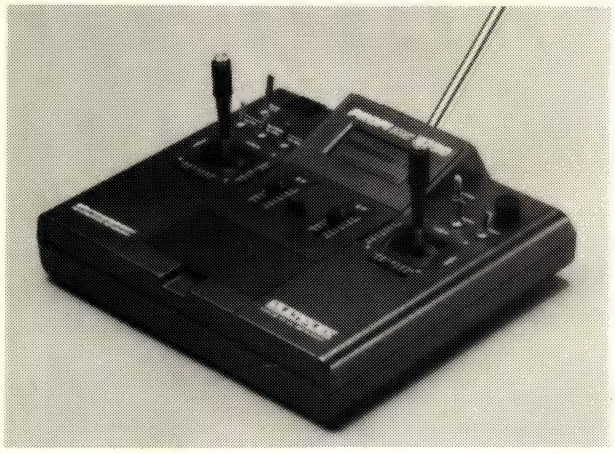

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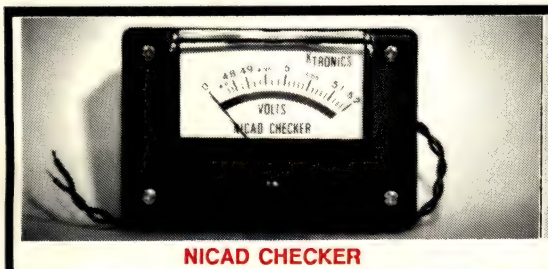

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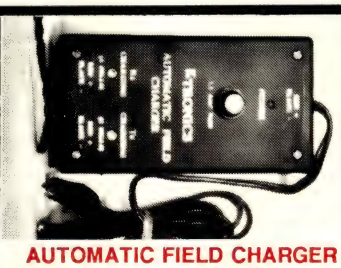

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Sukhoi 26 CONSTRUCTION

by Rex Brown

Introduction

The Russian designer of the Su 26 had made only jets since WW2, and when this aerobatic aircraft was first seen in 1984 it was a surprise. It was large for its purpose, and under-powered, so its performance was poor and it was dismissed as a failure. Within 2 years it had been redesigned. The new version was much lighter and had a more powerful engine and, in the control of a good pilot, it soon became clear that this was the plane to beat for the Aerobatics World Championship. It had a roll rate of 340 degrees per second and a climb rate of 3,400 feet per minute from its 360 horse power radial engine. I saw the Su 26 at the Bi-Centennial Air Show at Richmond Air Base in October 1988, and the demonstration made by the Russian pilot was fantastic. I knew that this was the aircraft for me to build.

The model first flew in October 1990. It weighed 7 kg with a Super Tigre 3000. It flew well but lacked enough power to fly in a scale-like manner. This is unusual for me, as usually my models are over-powered. The engine was replaced with a Zenoah G62, and the improvement was dramatic. The spark ignition G62 is easy to use, and all that is needed for a flying session is the model, some 25:1 petrol-oil and the transmitter.

Builder, Rex Brown, with the Sukhoi 26. A big project for experienced pilots.

CONSTRUCTION

Wing. The structure is very simple, being designed as a slot-together framework covered with sheet balsa. Note that there is no dihedral except for the thickness taper, which requires the ribs to be slightly angled when the wing is flat on the building board.

Start work by cutting out the ribs, then sandwich W1, 2, 3 and 4 very carefully, using the spar notch as a key. Cut out the hole for the wing joiner tube and check for a close fit. Sandwich the two root ribs, using the hole as a key, and drill the hole for the wing alignment dowel. Add ply facing to the root ribs.

Cut and notch the LEs and spars. Attach the bottom spruce spar to the balsa spar. Face the front of the spar with ply and cut the rib notches through the ply, which will be above the top edge of the balsa by the depth of the top spruce spar, which is placed in position after the ribs.

Pin down the bottom sheeting which is flat

from spar to TE. Glue the spar in place, spruce edge down.

Glue the ribs in place from spar to TE. When the glue is set, chamfer the bottom sheeting to match the ribs. Glue aileron servo mounts in position and drill the ribs for the aileron servo lead. Place wing TE packing to give washout.

Place top sheeting from spar to TE, then add LE when glue is set. Glue the wing joiner tube in place, leaving about 100 mm protruding from the wing. Roughen the outer surface of the metal for a better bond, and pack with scrap balsa at the rib joints. When the glue is set, remove the wing from the building board.

Shape the LE and ensure that the rib edges are parallel so that sheeting is not distorted. Add sheeting to the front of the wing. Add the wing tip block. Shape and smooth each wing panel.

Mark the position of the aileron onto the wing skin and cut it free, allowing for the aileron spar. Cut this spar, attach the hinge blocks, and glue it in place on the wing. Trim the aileron to take the aileron LE with hinge blocks in place. Add the block for the aileron control horn and glue the LE in place. Shape and smooth the ailerons and hinge them to the wing, but do not glue the hinges to the wing.

Make hatches for aileron servo access (there is plenty of room for a nice, large hatch), and face the wing root with ply to prevent damage.

Smooth the surface of the wings ready for finishing. I used ¾ oz glass cloth. Be sparing with the resin to minimise weight gain.

Fuselage. This is a big component of the model but is simple in structure, being a basic box framework with formers and sheeting added to it. Begin by cutting out the fuselage formers and stripping the longerons. Cut the ply fuselage doublers as a pair, making the holes for the wing joiner tube and incidence dowel very accurately. Drill the aileron servo lead holes at this time also.

The **Assembly Sequence** is as follows:
Pin down the longerons and add the verticals, one set flush with the building board and the upper set flush with the top face of the top pair of longerons. Glue the forward sheeting in place in the same relative positions as the vertical spacers at the rear. Face-off the surface of sheeting and longerons on the uppermost fuselage side frame and glue the ply doubler onto it. When the glue is dry, lift this entire frame from the board, turn it over and face the new side with the other ply doubler. When the glue is dry, separate the frames and box them together with the ply doublers on the inside.

Assemble the undercarriage support pieces and, before the glue sets, set the sub-assembly in place. Clamp the framework to the building board with the front overhanging its edge, and glue F1 into place with the re-inforcing gussets. Check that the frame is square using the building board as the reference.

When the frame is firm, add the formers, starting with F2 and working to F6, then the tailpost. Again, when the glue is dry, remove the frame from the board and add the side and bottom formers. Trim these to shape to give a smooth line to the fuselage as the cross section changes in the cockpit area.

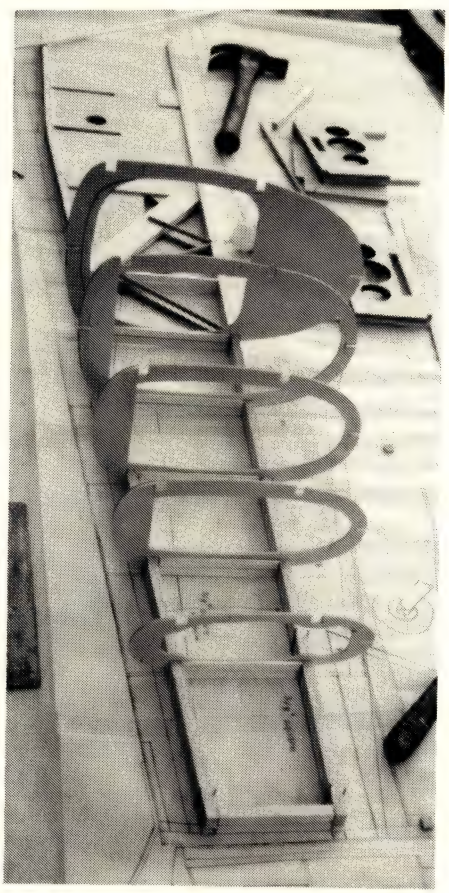
Cut out the root ribs for the fuselage, trim the formers to take them, and glue them into place using the joiner tube and location dowel to get correct alignment.

Fuselage sheeted and tail attached. Incidence dowel, hole for aileron lead and wing joiner tube are shown. Wing fillet built up onto side of fuselage.

Cut the undercarriage leaf from duralumin. I obtained some from a 4WD bull-bar maker, who also cut and shaped it.

Pin the hatch edges onto the top longerons, and glue the F7A formers into place. Blend and chamfer the edges of all the formers, and then sheet the fuselage, using pieces as large as possible.

The cowl is made from epoxy and glass fibre cloth over a styrofoam pattern. Build in some rear gussets to enable it to be attached to F1 with screws.



Trial fit of fuselage formers. Note sheet balsa across bottoms of formers to retain their proper shapes.

The cockpit canopy is pulled from PVA sheet over a pattern made from close-grained soft wood. Screw plywood strips to the opposite edges of the PVA sheet and use as handles to pull the sheet down over the pattern as it is heated with a heat gun. Glue the instrument panel in place, paint the cockpit, add a pilot and glue the canopy in place with 1M canopy bond. Cover the canopy while the rest of the fuselage is being finished.

Tailplane. Assemble the framewwork flat over the plan, as all pieces are 25 mm thick. Shape one side and cover with balsa sheet; lift from the plan and shape the other side before adding the sheeting.

Elevator and Rudder. Cut sheeting for one side to shape and pin down onto the plan. Add the leading edge and ribs. Chamfer the trailing edge of the sheet to match the ribs and add the other sheeting. Remove from the plan, trim the edges and add the block for the horn part of each component.

Fin. Pin down the rudder post and leading edge, and add the ribs. Sand all the joints flush, shape the leading edge and cover with balsa sheet. Remove from the plan and complete the other side in the same way.

Assembly

After all the components have been shaped and sanded smooth, glue the tailplane to the fuselage, using set square and trammelling string to obtain correct alignment. Add block on top of the tailplane to match the top of the fuselage. Glue the fin in place. The rudder post should match the tailpost on the fuselage.

Slide the wing joiner and alignment dowel through the fuselage, and slide the wing into position. Shape wing fillets from soft block or foam and finish in a manner appropriate to the material used.

Finishing

I used dope and tissue, over which I sprayed 3D primer-surfacer with Flexall added to prevent cracking. The surface was sanded and sealed, then sprayed with silver acrylic lacquer, two coats, sanding between coats. The trim was done by masking and brushing. When this was dry, the edges were lightly sanded and the whole model was coated with clear acrylic lacquer and then polished.

Motor Mount

I used a soft mount obtained from Scale Aviation. The Zenoah was mounted on a 150 x

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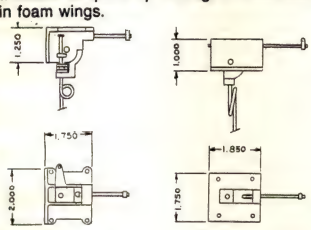

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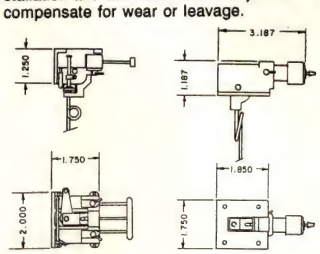

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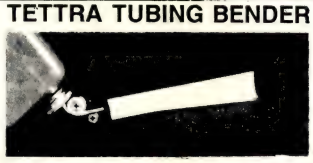

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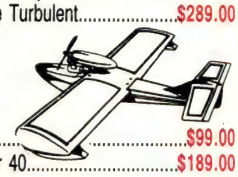

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7 x 9	$3.25	10 x 7	$4.50	12 x 10	$15.95
7 x 10	$3.25	10 x 8	$4.50	12 x 11	$15.95
8 x 4	$3.50	10 x 9	$4.50	12 x 12	$15.95
8 x 5	$3.50	10 x 10	$4.50	12 x 13	$15.95
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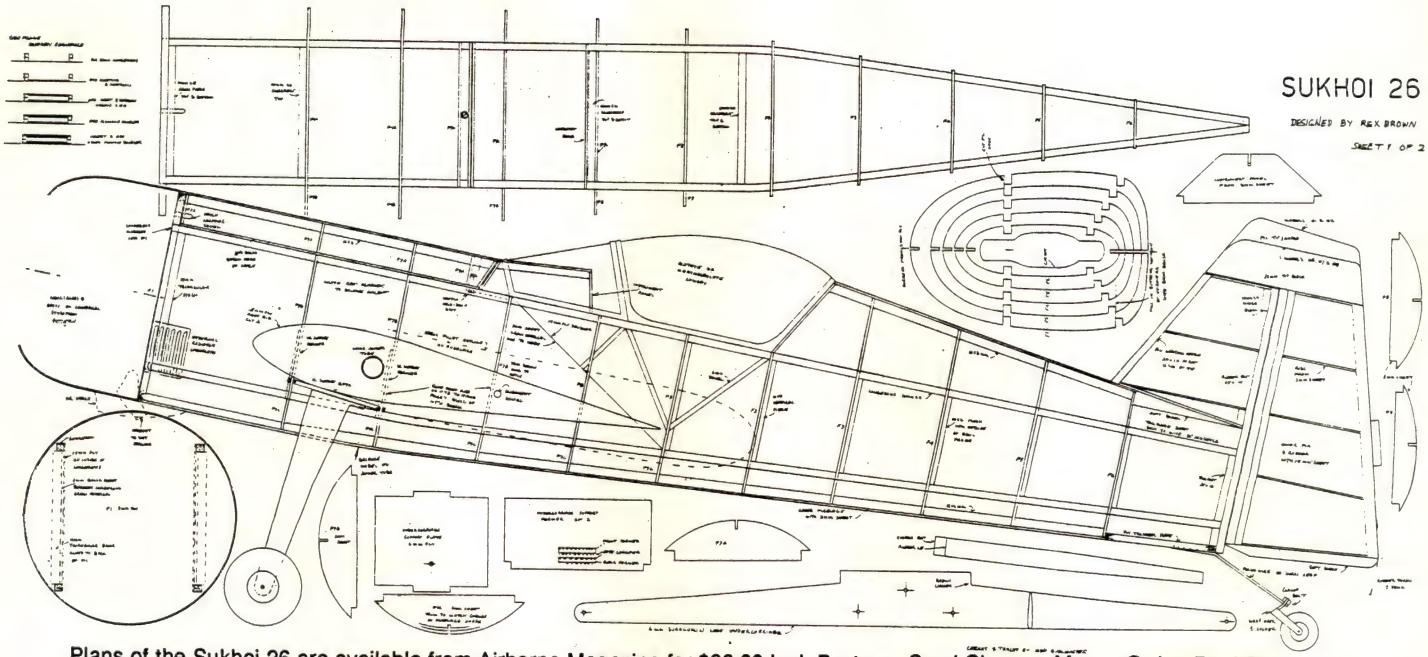
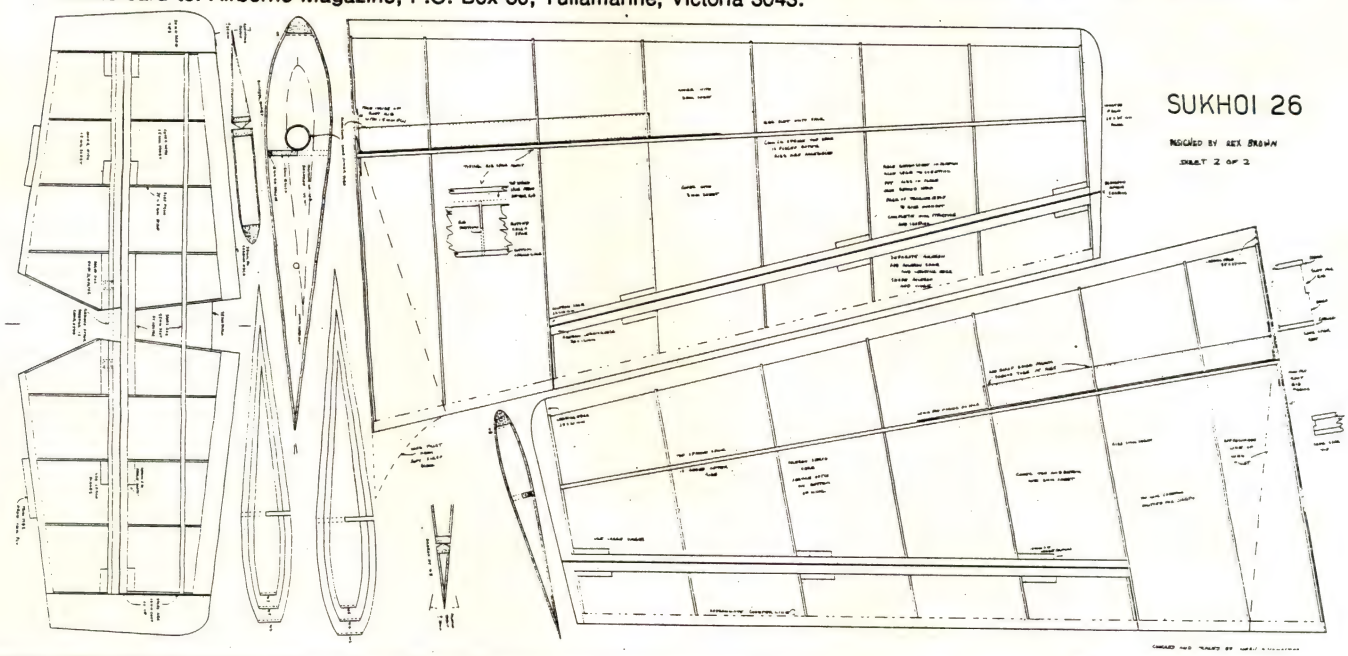
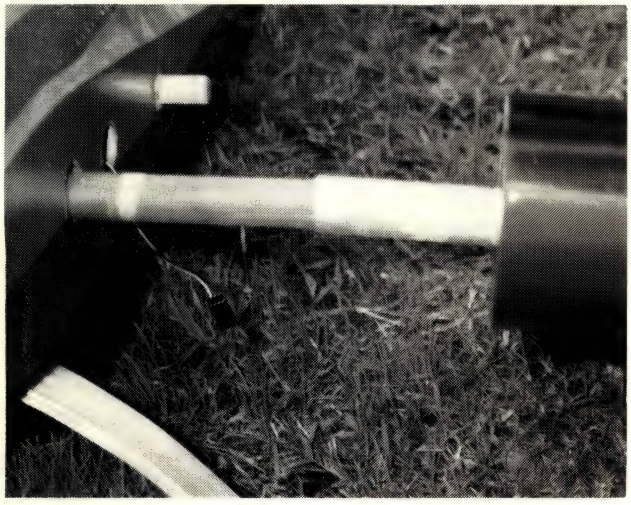


Plans of the Sukhoi 26 are available from Airborne Magazine for $38.00 Incl. Postage. Send Cheque, Money Order, BankCard, Visa or Mastercard to: Airborne Magazine, P.O. Box 30, Tullamarine, Victoria 3043.

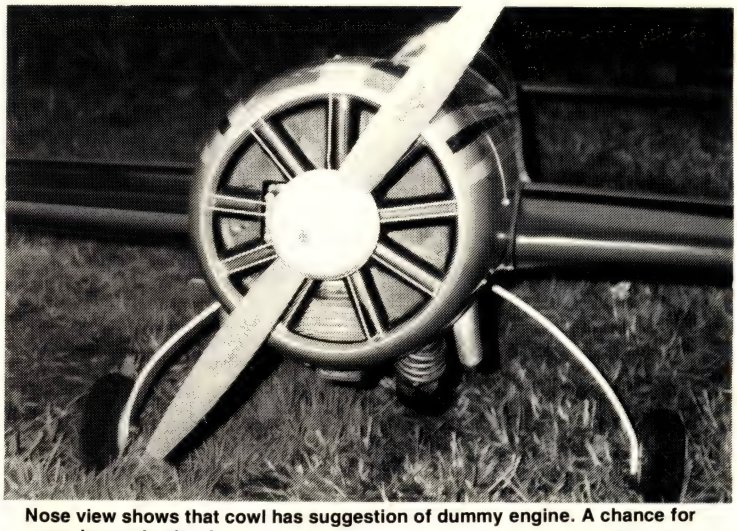


Tail detail shows paint scheme and rivets. Mustang in English, is friendly touch for a Soviet aircraft.

Rex shows the underside of the big aerobatics model. Colour reference material is available from Scale Model Research.



Wing root showing wing sections of tube slides over joiner tube into fuselage.



Nose view shows that cowl has suggestion of dummy engine. A chance for some improvisation here.

125 mm alloy plate. A soft mount is advisable for engines above 30 cc capacity.

Radio

I used high torque servos (5 + kg-cm), one for each aileron, with Y lead and extension leads; one for each elevator and one for the rudder. The throttle used a normal (3 kg-cm) servo. The 4 servos in the fuselage were mounted on a 3 mm ply plate, which was mounted to the fuselage on large rubber grommets.

The aileron drive is short, blue Nyrod. Each elevator is driven by blue Nyrod supported inside the fuselage all the way with wire inside the Nyrod inner. There is no flex with this system.

FLYING

The Sukhoi behaves like a large pattern model which, of course, it is, and should be treated as such.

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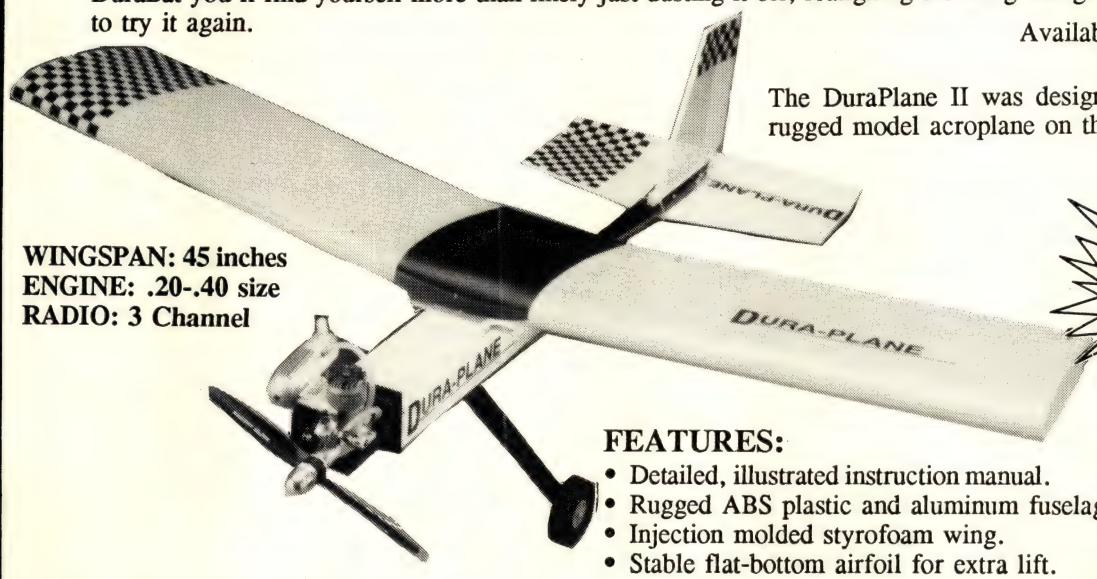

WINGSPAN: 45 inches
ENGINE: .20-.40 size
RADIO: 3 Channel

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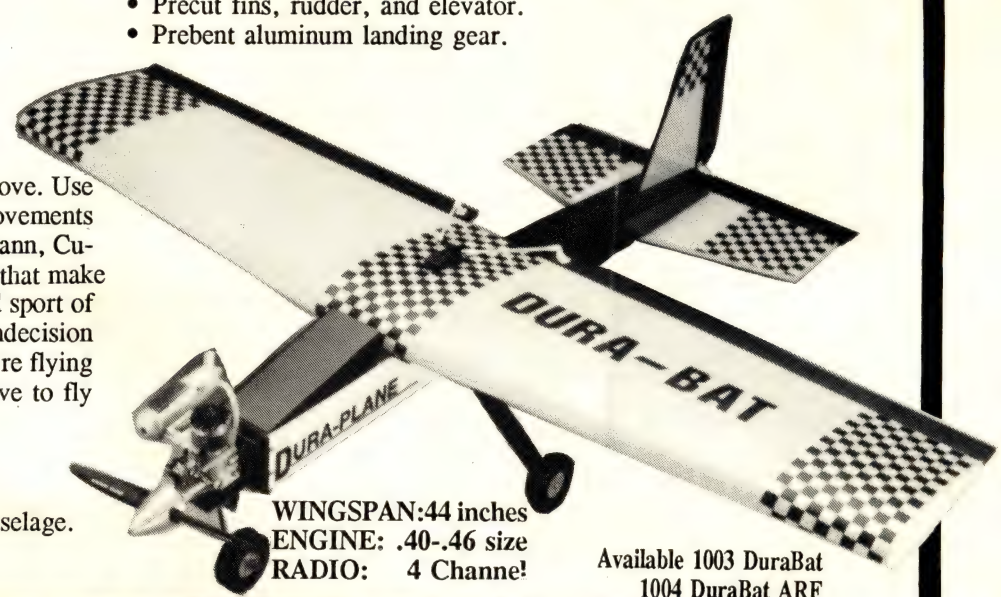

WINGSPAN:44 inches
ENGINE: .40-.46 size
RADIO: 4 Channel

Available 1003 DuraBat
1004 DuraBat ARF

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SCALE AUSTRALIA

by Ross Woodcock

HOW TO MOLD YOUR OWN CANOPY

Introduction

As promised last issue, I have prepared the following on how I mold my own canopies. Most of the information in this article appeared in Airborne in August, 1980; yes, nearly 11 years ago; and even though I have changed a few techniques as a result of further practical experience as different situations demanded over the years, the basics are still the same. However, it is still up to you to have a go; there is no substitute for hands-on experience. Also, I am well aware that the methods that I use are very basic, even crude, compared with what I am told that other fellows do, but my criterium has always been that we scale modellers are not into mass production, so after use, any molds and forms are superfluous. Therefore, any additional effort beyond the minimum is wasteful and adds nothing to the finished product.

I am often asked "Where did you get that canopy?" The answer is dead simple: "I made it." And if it wasn't also dead simple, I couldn't make it. But I didn't learn without making an attempt, so I will try to describe just how I go about it.

Cockpit canopy on John Crockford's Fairey Firefly, his first attempt to make a sliding canopy.

Material

I use poly methyl methacrylate, commonly known as Plexiglass or Perspex. Incidentally, Perspex is a trade name, but it is also the name by which this material is known almost universally. Perspex has a number of advantages and disadvantages. The disadvantages are:

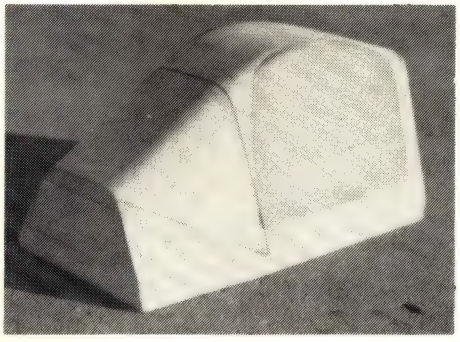
1. It is a little difficult to obtain (speaking in terms of trying the local hardware store on a Saturday morning).
2. It is a trifle expensive.
3. It has to be handled a little differently from celluloid; it's not as easily cut.

However, I feel that the advantages outweigh the disadvantages by more than 2 to 1. The advantages are:

1. It has a better appearance.
2. It doesn't discolour.
3. It doesn't suck in or distort.
4. It withstands harsher treatment (prangs and such like).
5. It is easier to attach things to, such as mechanisms for sliding canopies.
6. It can be filed, sanded and polished.
7. It doesn't go up in flames in the forming process.

The Mold

I believe that everything should be as simple as possible, and that is the way that I approach the whole operation. Let's start with the cockpit or canopy shape which, of course, is the male part of the mold. You must make this mold smaller by the thickness of the perspex material you are going to use. I use 1/16 or 1.5 mm. Some people will consider this to be far too heavy, but the weight penalty is compensated for by the ease with which 1/16 can be handled compared with anything thinner. I mostly make the pattern or male mold out of a timber known as Jelutong, which is a Malaysian softwood, obtainable in relatively small sizes from specialist timber suppliers.It has a yellowish appearance and is a delight to handle. It carves, cuts and sands better than any timber I have experienced. This is the timber used by pattern makers and professional modellers, and that is where I first came across it.

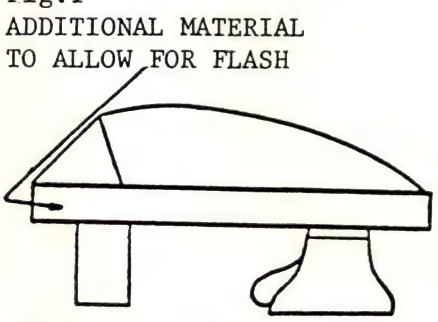


Pazmany PL4A canopy mold made mostly from pine board. Craftwood may be suitable.

You can, of course, use just about any timber for a one-off job, but you have to be very careful and fully conscious of the grain problem. Any irregularities of shape, form, courseness of grain or surface finish will show up on the final product. These blemishes, for the most part, can be cut and polished out, but this process is a long, protracted business that you can well do without. The timbers such as sugar pine, spruce and oregon are easily shaped to the desired form, but these timbers are the prime examples of grain problems, as the timbers appear to be laid up in layers of one hard and one soft, and even after you get your mold good and smooth, the grain seems to show up in the final product. Balsa can be used, but you need the hard variety and for large molds it can be more expensive.

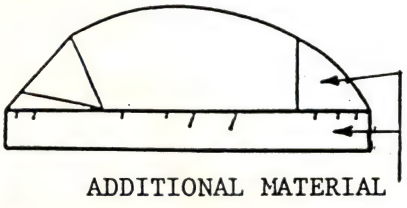
Most modellers are interested in one-off jobs only, so you can forget all you have read about surface finish. Most finishes, such as dope, talc and epoxy, burn off and deposit themselves on the perspex, leaving you with a spoilt canopy and a ruined mold, requiring more work before you can mold another canopy. I have one mold which is six years old, from which I have made approximately 150 canopies, and all I do is give it a light sand with 400 wet and dry, used dry, before each molding session. The mold should have a flowing shape. The bubble type canopy can be molded without any timber added to the mold except the deepening of the base or skirt to allow room for the flash (Figure 1).

Fig.1



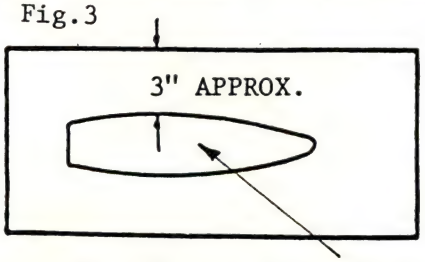
Molds for cockpits of aircraft with a turtle deck, such as a Spitfire, require additional build-up on the rear end to assist in a smooth flow of material (Figure 2).

Fig.2



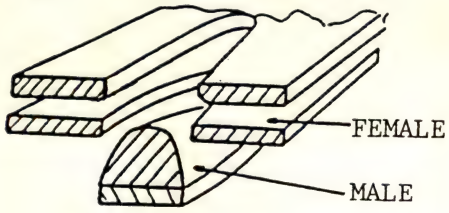
The female mold is simply two cut-out profiles of the plan shape of the mold plus 1½ times the material thickness (Figure 3). You need two of these forms to sandwich the hot perspex between (and preclude burnt fingers). The top form needs to be of stout timber, whereas the bottom form can be ¼ ply. In fact, I build mine out of ¼ ply and back the top only with ¾ inch pineboard to preclude the bending and give me just a little additional purchase. I have used pine-

Fig.3



board only, which is OK for one-off jobs, but it won't stand up to extended use. The edges that come in contact with the perspex must be nicely rounded and sanded clean and smooth so as not to scratch the perspex when it is hot, as you cannot guarantee success the very first try.

Fig.4



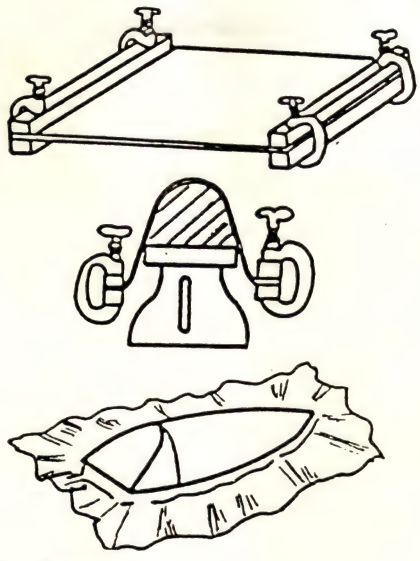
CROSS SECTIONS

There is no need to dowel the two female forms to obtain exact line-up; remember that this is a transparent material so you can see both sides at once and they will adjust themselves to fit if slightly out of adjustment.

Now, for a fellow who has spent a lifetime looking for an easy way out, the preparations to date can still be a lot of work, particularly on a large canopy. Before you discard a model subject as being too complicated when it comes to a cockpit or canopy, take another look, as did the original manufacturer. See if you cannot make the canopy with a series of smaller, less complicated molds. Even with the experience that I have gained, I ran into trouble with the canopy I made for my modified Aeromaster B1, so I made it in two parts; windscreen and sliding portion. This simplified the process of molding, as it didn't need a female mold. The process I used for the Aeromaster and the PT 26 Cornell was to make the canopy in segments. First I made the patterns, observing all the facts that I have mentioned. The PT 26 canopy was made in five pieces: windscreen, rear screen and centre panels. There was no need to make one large mold; indeed, I didn't have that much wood, anyway.

Draw the perspex over the area to be molded, hold until cool, remove, rearrange the mold so as to allow access to a straight down pull and then mold the windscreen portion using the same method. When cool you can cut and clean the two portions to mate with one another along the line where the sliding portion would meet the screen, and you have a canopy that you can justifiably be proud of.

Fig.5



The Process

For handling the perspex I clamp 4 pieces of wood to the edges of the perspex to use as handles to gain purchase. The clamps (or whatever) must be placed so that you won't touch them when drawing the perspex, as they are HOT (Figure 5).

For heating the perspex I use an oven; not oil or boiling water; just a standard kitchen oven, gas or electric. Set the temperature regulator to 400°F, arrange the grids inside to allow you to get up to the top of the oven, wipe them clean and simply lay the perspex on the grill after you have removed the protective paper; there is no need for a flat plate. Now you need to keep your wits about you. Set up your pattern close to the oven, on the kitchen table or the sink. (Maybe it would be as well if you sent your wife or mother out for the afternoon.) Set it up with enough room to get your fingers under the mold; use anything that comes to hand - baby food tins or upturned tea cups (depending on the age of the family) - use anything as long as it is no bigger than the base size of the mold.

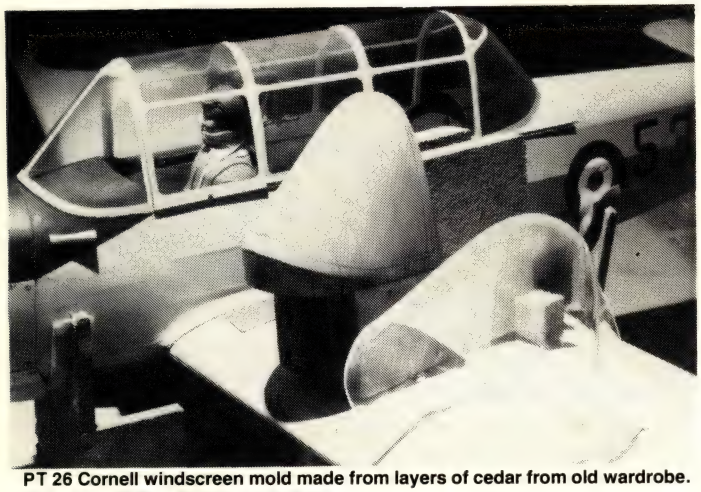
Have the female molds handy to the oven. I use a folded tea towel or an oven mitt for transferring the hot perspex from the oven to the female mold. When the perspex assumes a condition similar to soft rubber, withdraw it from the oven, place it between two female molds, align it above the male mold and press down, REALLY push down, and hold for about one minute. One minute seems like ten minutes at this stage, so time it. This is the time taken for the perspex to harden. It will still be relatively hot but it won't change form appreciably after this time. This process needs to be done very quickly without burning yourself. Gloves seem to get in the way so it might be to your advantage to practise a few times before you heat your material.

Remove the female form and see how you went. If it worked first time, put it down to beginner's luck. For you normal guys who are not happy with the results of your first effort, analyse what went wrong. It may be that not enough room exists between the male mold and the female mold for the perspex, so you must relieve this situation.

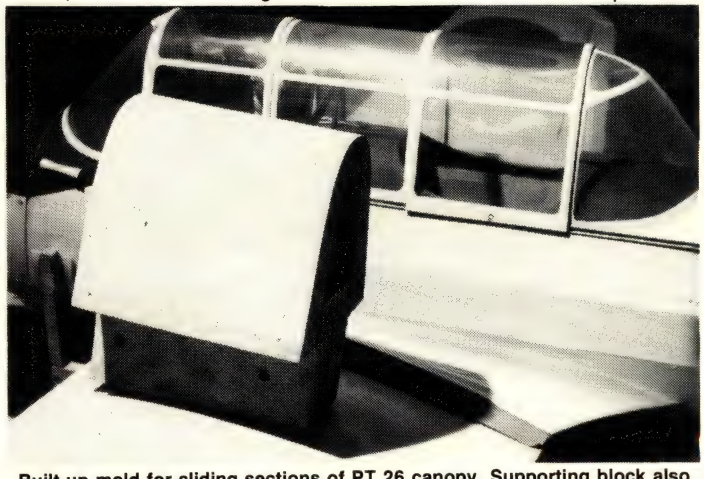
The first time round you almost always haven't got the material hot enough, so you just put the molded perspex back into the oven. As soon as it starts to heat up it will flatten out and allow you to make another attempt. You can flatten it out as many times as is necessary; just take care not to tear it when it is flexible by forcing it where it obviously won't go. This heating process is not one where you can knock off for a cup of coffee; you must watch that you don't leave it in the oven too long and burn it. It won't burst into flames as will celluloid in similar circimstances, but you will notice small white bubbles appearing in the material, and you will even be able to hear it popping and crackling from outside the oven. If the perspex is ruined due to over-heating, you will have no option but to discard it and start again.

Cutting and shaping the base of the canopy can be a bit of a trial. On the one-off type job, mark the final shape of the canopy on the mold before you form the perspex over it. You can take hold of the mold plus the canopy and, using a hacksaw blade or a junior hacksaw, cut through the perspex just outside the line, and lift the almost completed canopy off the mold.

Warning. This is the last time that you should cut the perspex. From now on any twist of the blade, no matter how slight, would tend to crack the perspex. From this point on the best way to shape the edges to suit your model is to grind it to shape, using a Dremel cut-off disc for preference, or a sanding disc, sanding drum or grindstone on an electric drill. Perspex won't



PT 26 Cornell windscreen mold made from layers of cedar from old wardrobe. Note cut-off line drawn on pattern.



Built-up mold for sliding sections of PT 26 canopy. Supporting block also serves as handle, all made from pine board.

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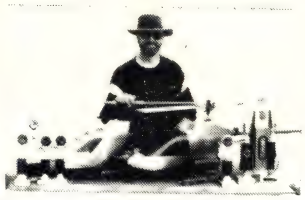

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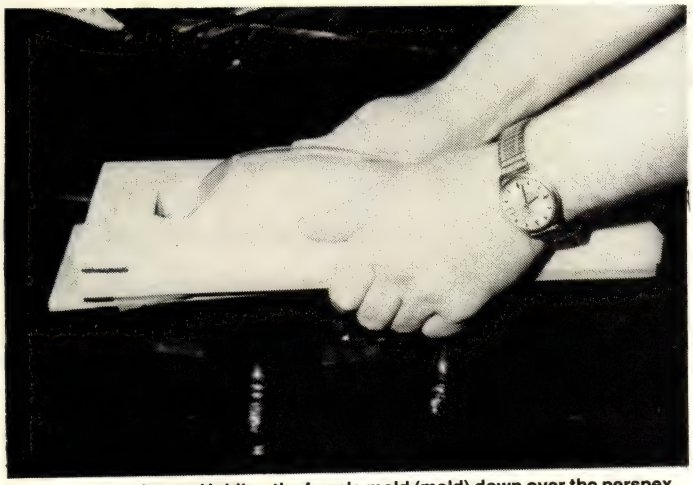
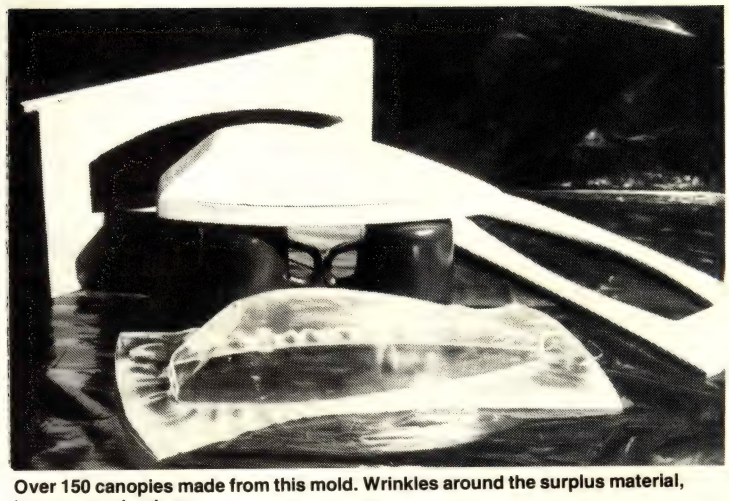


Hands-on experience. Holding the female mold (mold) down over the perspex and male mold (pattern).



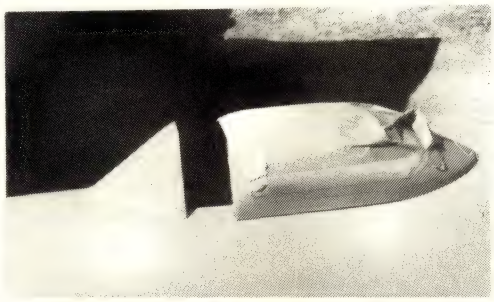
Over 150 canopies made from this mold. Wrinkles around the surplus material, but canopy is clear.

clog a grindstone as will aluminium and the like, so you can use your mate's or father's without them knowing. **Wear safety glasses or goggles when grinding the material,** as it can be painful if you get it in your eye. Another advantage of using stiff material for the canopy is that it can be more easily masked and painted to gain that little extra in appearance. The method I use is as follows:

Finishing

Clean the canopy, determine if it has any undesirable marks (e.g. the wood grain) because now is the time to polish them out. The grade of paper or cutting compound used will be determined by the extent of the damage which is to be removed. However, you should end up using 400 wet and dry paper, wet. At this stage it should be almost transparent again. Finish off by polishing with Brasso or some similar liquid polish. For our purposes it is not necessary to use perspex polish.

The front portion of the canopy or windscreen can be masked off. I use Contact shelf paper. The rear portion of the canopy should also be masked off leaving approximately ¼ inch uncovered around the base. Prepare the cockpit area, pilot, instrument panel and so on. Run a bead of balsa cement around the edge and position the canopy on the model and hold it in place with a rubber band or masking tape. Balsa cement has been found to be the best glue under normal conditions as it mildly attacks the perspex and creates surface adhesion whereas the often-used epoxy glue doesn't do this and so doesn't produce as good a job.



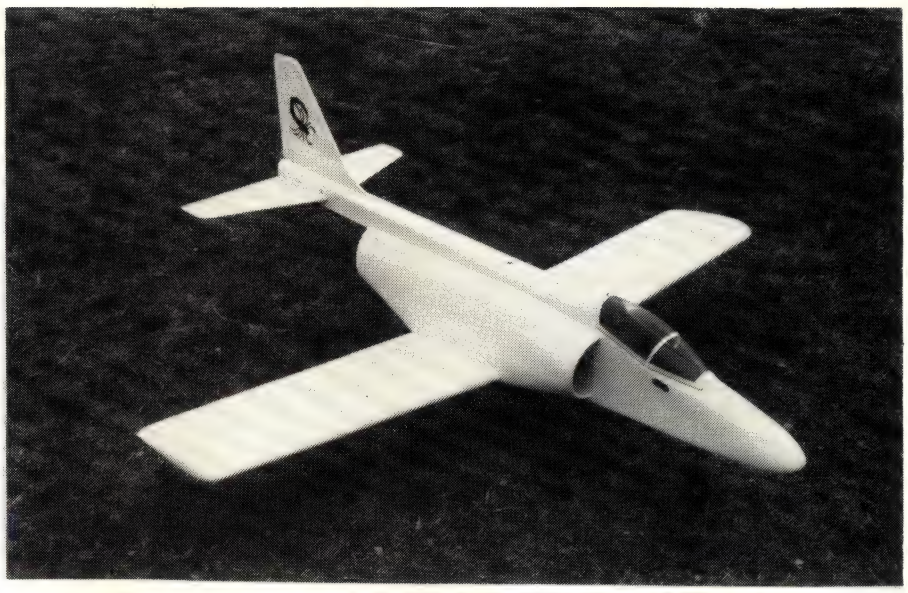
The windscreen is blended to the fuselage. Sliding portion masked for paint. See text.

When the glue has dried, remove the hold-down band or tape. Lay a healthy bead of glue all around the canopy base and smooth it into a fillet with your finger (wet). Allow it to dry and repeat as many times as you like. I always finish with a smear of Bond O fill or Plasti Bond or similar, and sand it back to a nice smooth fillet. Always sand right back to the masking tape on the canopy.

Finish the rest of the model, and paint. After the paint has dried, run the point of a knife around the edge of the masking tape (don't worry about cutting into the edge of the canopy) then peel the tape off and you can be almost certain that your canopy will look as if it grew there.

That's just about it, except that I failed to mention how to cut the perspex sheet to size. Leaving the protective paper in position, mark out the required blank accurately on both sides. Using an old blade in a balsa knife, score the sheet deeply on both sides; 3 or 4 passes with the knife should do. Then position the perspex on the edge of the table as you would glass, and crack it off. See, it's easy!

Fantails



The columnist's Scorpion 40. Russell says it is the easiest flying model in his experience. Aircraft is all white. Note the emblem on the fin!

ALL-MOVING TAILPLANE

I'm sorry guys, but you are going to get yet another serve on how I figured out a system on my current model. The model is a simple, straight-wing, all wood model. It has a boom type tail so that the exhaust duct is as short as possible. The wing section is relatively thick, with a rounded leading edge. This section, scaled up from an earlier kit design, has a good load-carrying capability and is very docile at low speeds. Of course, this type of wing section probably does have a drag penalty, however, you would not know it as, with the landing gear retracted, performance is quite satisfactory for this type of model. It is amazing just what retractable landing gear does for a model. The penalty of added landing gear weight is a small price to pay for such a remarkable performance gain. The wing chord line, thrust line and tail-plane chord line are parallel.

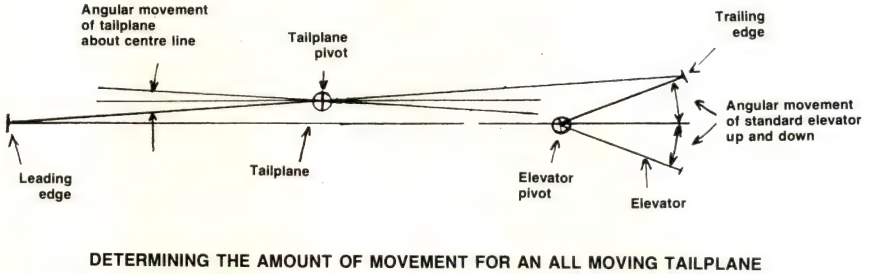
As this model has a straight, let's call it a jet trainer type, wing, I was concerned that the centre of gravity would be too far rearwards. That is the second reason for the boom type tail; to keep the rear end light. Going on past experience, the centre of gravity was to be located well forward of what is normally accepted, at between 20 and 25 per cent of mean aerodynamic chord. The wing does have a little bit of taper on the leading edge, but this will be eliminated in the next version in the interest of construction simplicity.

You may ask 'Why locate the CG so far forward?'. The answer is that the duct inlets have been optimised for best airflow at moderate speeds with, perhaps, lower power engines. The inlets, with rounded leading edges, are larger than would be used for higher speeds. I think that, possibly, these inlets have the effect of moving the centre of lift of the whole aircraft forward slightly or, put another way, can give a nose up pitching moment to the aircraft.

Anyway, this aircraft ended up with a CG at approximately 20% MAC with fuel tank empty. The fuel tank is located 20 cm forward of the wing leading edge, which makes the model even more nose heavy, but not noticeably so.

The control set-up on this model was intended to be the normal aileron, elevator, rudder configuration. To make things easier for transport, I decided to replace the standard fixed tailplane and elevator with an all-moving tailplane set-up. The tailplane is removeable so that the model will fit into a smaller box.

This is the first time that I have used an all-moving tail, which made my approach to the subject quite cautious. I have seen quite a few models fly with this type of control. All seemed to be successful in flight but often suffered from various mechanical problems.



DETERMINING THE AMOUNT OF MOVEMENT FOR AN ALL MOVING TAILPLANE

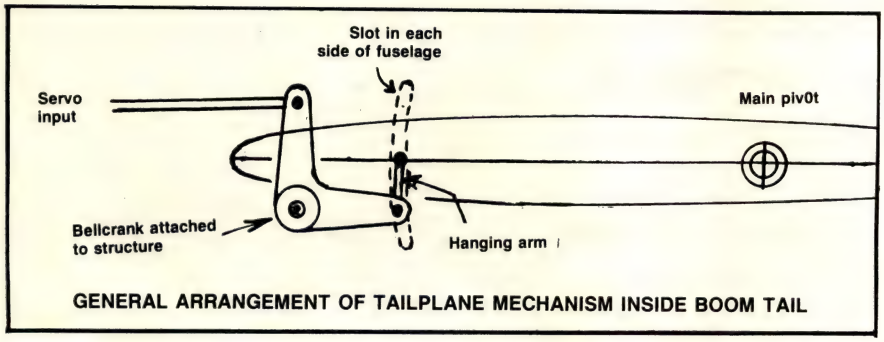
All-moving tailplanes are usually pivoted on a single shaft that passes through the rear fuselage. Attached to this shaft is a control arm. The elevator servo inputs to this arm via the normal pushrod. The main problem that I see in this system, which does work well, I might add, is that if it is not carefully designed and built, the smallest amount of slop in the control linkages is magnified at the tailplane. Also, it is often difficult to make the pivot mechanism and bearings.

After sketching several different tail configurations, a final design, as shown here, was decided on. Basically it has the normal pivot shaft, which I located at approximately 25 per cent of the tail mean aerodynamic chord, and a second control input rod, located as far forward towards the leading edge as possible. Why make it so complicated? Well, so the theory goes, the main pivot is intended to carry only stabilizing forces from the tail into the fuselage, and the forward input rod handles mainly the control input forces.

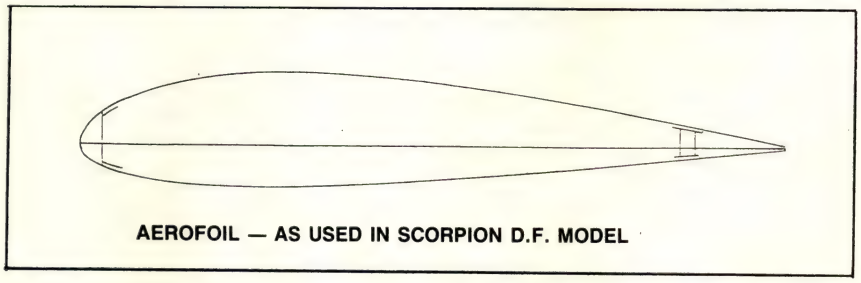
With this system the control input mechanism is a little bit more complicated and may be prone to a build-up in sloppiness if not carefully constructed. Where it justifies itself is that there is finally less slop (free up and down movement) at the tailplane. This may help reduce control surface flutter, especially at the higher speeds that ducted fan models often experience. Control surface flutter can lead to pivot wear, increased loads on the servo and, ultimately, structural failure.

The next worrying question is "Just how much movement up and down should an all moving tailplane have on a model aeroplane?". We have all seen those magnificent films of full size Phantoms and so-on, especially at take-off, where the tailplane moves through 30 to 40 degrees. Well, that, it seems is not the way to

F20 and Tigershark by Trim Aircraft. Not quite mirror images! Ian le Bronne photo.



GENERAL ARRANGEMENT OF TAILPLANE MECHANISM INSIDE BOOM TAIL



AEROFOIL — AS USED IN SCORPION D.F. MODEL

do it with models! To save the pain of trying to describe how to arrive at the correct amount of tailplane movement, take a look at the accompanying sketch. It is surprising just how small the tailplane movement is.

As far as aerofoils go, I stayed with a symmetrical section with a rounded leading edge. Flight response at low and high speed has proved to be smooth without over control.

Both the rudder and tailplane servos are located in the boom, very close to the control surfaces. Servo installation was quite difficult, due to the limited space and, of course, long extension leads were required to connect the servos to the receiver under the cockpit.The receiver antenna is located in the fuselage, well away from the servo leads. So far there have not been any problems with the radio operation.

SYDNEY JET FLY; 18 & 19 May 1991

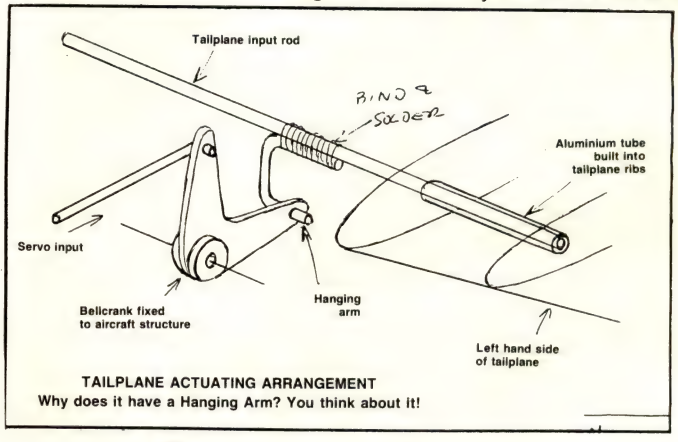
from Ian Le Bronne

Firstly, a brief word about the origin of this event. About July last year, Ken Jack, Stan Allen and I sat down one Sunday and decided that it was time that Sydney had its own ducted fan meeting, as Melton (Vic.), Amberley (Qld.) and Leeton (NSW) were already in their second year of holding jet-only type events. It was also clear that our flying area, Marquette Field, Pittown, was ideal.

As the event got underway on the Saturday it was clear that it was going to be a success. The weather was perfect, the runways were in excellent condition thanks to club members, and the turn-up of pilots was quite substantial, especially country and interstate visitors, considering that this was Sydney's first jet meeting.

The last count showed 18 models, all of which were flown on a regular basis throughout the weekend. The models varied from the lastest high performance Bob Violett Aggressors to scale models such as the F86 Sabre. The reliability of operation of these models and their performance in the air; i.e. endless vertical climbs, just shows how far ducted fan technology has come.

Throughout the weekend we had special events. One was timed high speed passes, which was won by John Hull of Leeton. He won a Rossi 90 and trophy. We also had a people's choice draw in which the public voted for what they considered to be the most impressive scale model and also for the most appealing. These two categories were won by Ken Jack's F86 and



TAILPLANE ACTUATING ARRANGEMENT
Why does it have a Hanging Arm? You think about it!

Robert Farrell of Mildura with his Byron Mig 15 powered by a Rossi 80. Did some cross-country flying to get to the Sydney DF Rally. Le Bronne photo.

A Bob Violett Aggressor flown by Yani Hatizidis at the Sydney Jet Fly at Marquette Field near Penrith.

John Hull's Spectre (Trim Aircraft), respectively.

During the course of the weekend Ross Woodcock kept the public and pilots informed with his expert commentary. On the Saturday night most of the pilots and their families went to the Richmond RSL for dinner and drinks.

On the Sunday there was a mix of jets and other scale models, which proved to be quite acceptable, if not crowded. The end result proved the Sydney Jet Fly to be a total success.

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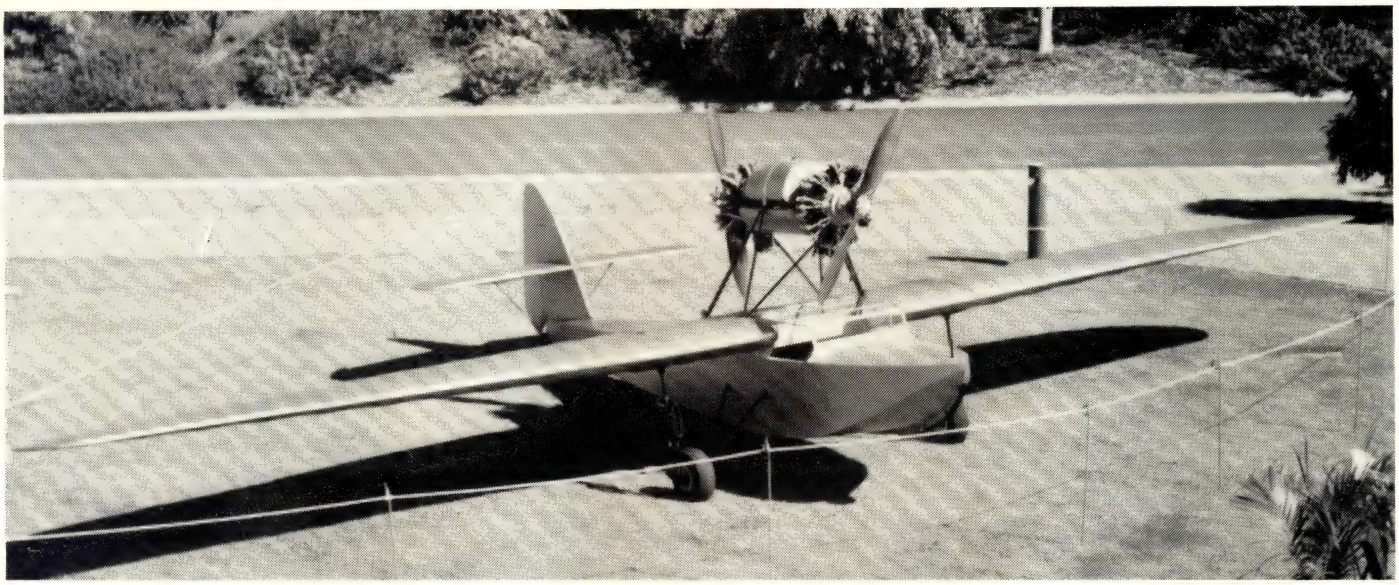
The Hinkler Ibis Replica

by John Farmer



Ibis on lawn of Hinkler House on unveiling day, 14th April 1991, taken from balcony of Hinkler House. Photos from the author.

The Aircraft

Bert Hinkler's record-breaking 1928 solo flight from England to Australia in 15½ days was made in an Avro Avian biplane. *(A plan of the ¼ scale model is available from the Airborne Plans List.)* After this historic flight he donated the Avian to the Queensland Museum, where it has remained since. On Hinkler's return to England he went in search of a more suitable cross-country touring aircraft. Because of the limitations of aircraft such as the Avian, he had in mind an amphibian, but was unable to find a suitable two-seater in production. It was then that Hinkler and Roland Bound began designing one of their own, which they called the Ibis.

The design was of two seats, side by side, with tandem engines mounted on top of the wing, and a fuselage shaped somewhat like a boat. A folding undercarriage was envisaged for production, but this was not on the prototype. Bert used the undercarriage from an early Avro 504 biplane in order to get the Ibis airborne and do some trial flights. From all reports the Ibis flew well, so Hinkler went in search of existing manufacturers to take on production, but none was to be found.

The year was 1930 and times were hard with the depression, and manufacturers were quite reluctant to gamble on a new design of such peculiar shape. Bert Hinkler had not the capital himself to go into production, having spent much of his savings on the prototype, so he dismantled the Ibis and stored it in a shed at the back of his house in Southampton, England.

In the early 1950s the Ibis was discovered when the property was put up for auction and the shed had to be removed for development. It was saved from being scrapped by Henry Sisted, managing director of the Hampshire Aeroplane Club, who intended to restore the Ibis to airworthy condition, with a view to putting a modified version into production. During examination of the airframe an amazing discovery was made. Sewn into one of the wings was Hinkler's original log of the 1928 England to Australia flight. It is now preserved in Canberra.

Nothing came of plans to put the Ibis into production, and after interest had waned the airframe was moved from place to place. By 1959 it had deteriorated beyond repair, and after examination by the Royal Aeronautical Society, was scrapped the same year. Legend has it that it was used for a bonfire on Guy Fawkes night.

The Designer

Bert Hinkler was born in Bundaberg, Qld., in 1892, and at an early age was fascinated by flight. Close study of the ibis birds that populated the water regions near his home led to Hinkler building and flying model gliders which, in turn, led to him buildiong a full size glider when he was in his late teens. A full size replica of this design is in the Bundaberg and District Tourist Information Centre.

When Hinkler's home in Southampton was to be demolished, a group of people from Bundaberg, led by Lex Rowland, travelled to England to rescue the house and ship it in containers to Bundaberg to relocate it in the Botanic Gardens as a museum to Hinkler. Ever since it has been a popular tourist attraction.

After the house had been set up and running for a couple of years, Lex mentioned the idea of building an Ibis, but it was not until 1987 that the idea was brought up again. This time working drawings were drafted using the 3-view outline drawings and old photographs on display in the museum. Often the question of "Why not a flying replica?" was asked. This would have absorbed an enormous amount of money and many years of experimenting and load testing to pass regulations, as no original construction drawings existed. Even then it may have been flown for only a small number of hours and then put in

Ibis on the lawn at the rear of Hinkler's house, the one brought out from England to Bundaberg. Tailplane is mounted well up on the fin to avoid most of the spray when flying from water.

the museum for safe keeping. So a non-flying replica it was to be.

The Replica

Weight was not an important factor in construction, so whatever material suited a particular job was used. The original was of all wood construction, as is the replica. Ribs were cut as one piece from ¼ inch exterior ply, as well as the sides of the box spars. Timber stringers were used throughout, and the sides of the fuselage were sheeted with ⅛ inch ply. All rib caps were ⅛ inch ply. Cross-bracing with turnbuckles was used in the wing to firm up the structure.

The engines became a major stumbling block, so letters were sent to England and France to locate original Salmson AD9 40HP radials. Eventually one was found, in bits and pieces, in Australia, and this was used to cast a dummy second engine, crankcase and eleven cylinders because two were missing from the original, and odd bits and pieces. With much tinkering and persistance, it paid off, as it is very hard to tell which is the original.

Another concern was the cockpit layout and instrument panel, as no photographs existed. After consultation with pilots who flew the 'early birds', including Alan Petersen, believed to have flown the first Tiger Moth in Australia, and long-time flying instructor, text books of instruments of that period were made available. Photocopies of the instruments needed were made, and a little touching up was in order. Another photocopy was done, enlarged slightly to the correct size with the copier set to the darkest shade to produce an authentic-looking face ready to be set in a mock-up casing, complete with needle and glass cover. The dual throttle control levers and compass were also made from a variety of different materials found under the bench.

The covering material used was Ceconite 102 medium grade. The 50 yards consumed many gallons of dope, starting with the recommended full size procedure of nitrate for adhesion and first coat, then moving on to butyrate for approximately six finishing coats. Then silver pigment was added to the butyrate for the final colour coats. All the dope, except the first nitrate coat, after heat shrinking, were sprayed on. The entire airframe, including the fuselage, was covered with material, as was the original.

A labor of love... John Palmer with the replica of Hinkler's Ibis

Hinkler's dream is taking shape

By JEREMY SCOTT

IN A SHED next to a house in a quiet Bundaberg street, the ultimate dream of pioneer Australian aviator Bert Hinkler is taking shape.

Almost 60 years after his death, Hinkler's Ibis is rising from the ashes.

The plane which he designed and built, and which met an ignominious end in a children's bonfire, is being reconstructed to go on show in the city which still treasures Bert Hinkler as its favorite son.

Bundaberg's Hinkler Home Construction Committee is spending $12,000 to build a full-scale replica of the Ibis which brought Hinkler his greatest joy and then broke his heart.

The project began last April and is in its final stages. The model, which will be identical to the original except that it will not fly, will be unveiled at the Bundaberg Historical Society Museum on May Day.

"The Ibis was the culmination of Bert's thoughts, his ultimate machine," said construction committee chairman Len Rowland.

"It was a truly revolutionary aeroplane for its day. Bert could see a future for it."

But no one else could in the Depression-ridden 1930s and Hinkler's dream to put the Ibis into mass production came to nothing.

In 1933, dispirited and reportedly fed up with "everything and everyone", Hinkler crashed another plane into a mountain in Italy and died, aged 40.

Hinkler named his Ibis after the wading birds he studied as a boy, catching them to examine their wings.

His design was a small, all-wood shoulder-wing aircraft with a boat-like hull, powered by two engines mounted where the wing.

He believed it to be an ideal touring aircraft with excellent potential for military reconnaissance.

The plane was completed in 1930 and Hinkler repeatedly tried to find a manufacturer for his design.

After his death, the Ibis lay forgotten in a shed until 1952 when it was rediscovered. In an amazing twist, Hinkler's original log of his heroic 1928 England-Australia flight was found serving as one of the plane's wings.

The Ibis was exhibited last summer rained and the plane was moved from one place to another, falling into disrepair. In 1959, children of servicemen at a British naval base used the Ibis for a Guy Fawkes night bonfire.

Hinkler's surviving sister, Queenie Palm, and brother-in-law Lou Palm, who still live at Bundaberg, said the reconstruction of the plane was a fitting tribute to their Bert.

"I think he would be very proud indeed that someone has taken up the cudgels," Mr Palm said.

The 7m-long replica, with its 12m wingspan, is being fashioned as lovingly as was the original.

It will feature the same 40hp Salmson engines, now museum pieces in themselves.

Aero-modeller John Farmer, who is building the plane in his shed, said: "It's a labor of love. There is some remuneration, though. They wouldn't let me do it for nothing."

The original . . . Bert Hinkler with his famous Ibis

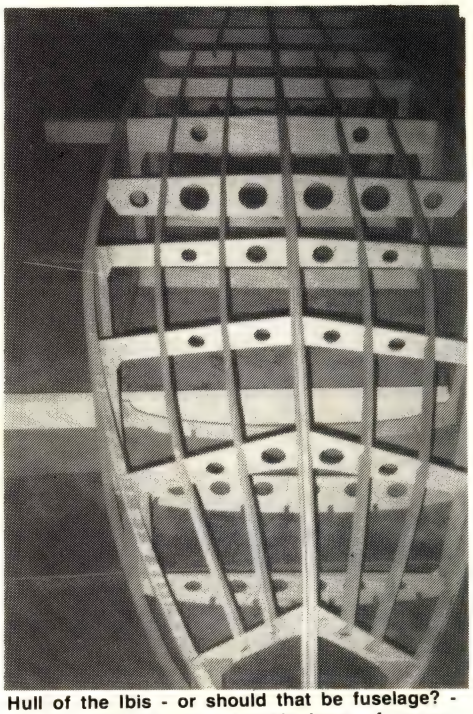
Hinkler's original Ibis was registered and allocated the civil registration G-AAIS, though the letters were never carried.

With the replica finished, a suitable time for the unveiling had to be set. Due to inforeseen circumstances this became a little complicated and dragged on for some time. Then, late in 1990, the Bundaberg Aero Club announced that they would run an Air Challenge Tribute to mark the 70th anniversary of Hinkler's historic record-setting flight from Sydney to Bundaberg in 1921, flying non-stop in an Avro Baby. The Challenge was well supported, with contestants flying the same course in a variety of small aircraft. The Hinkler Commemoration Committee had the perfect opportunity to present the Ibis, as the Challenge was held on Saturday 13th and the unveiling on Sunday 14th April.

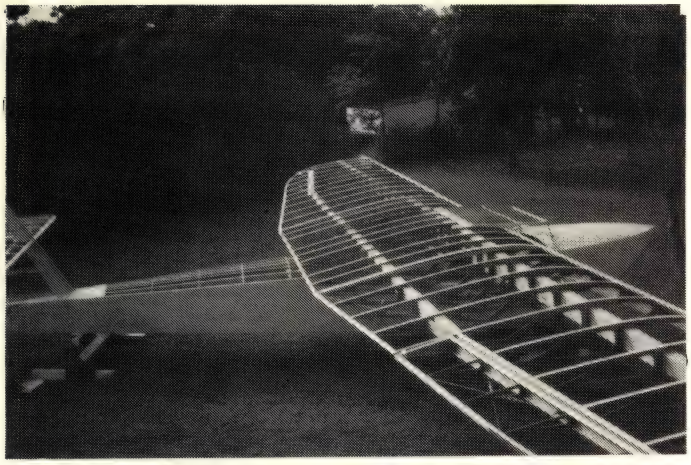
Undercarriage of the Ibis, showing brackets to hold bungee cord for absorbing vertical shocks.

The official unveiling of the Ibis replica was made by Mr. Peter Morris, House of Representatives member of the standing committee on Transport, Communications and Infrastructure. Another official guest was aviation author, Ted Wixted, often referred to as the walking encyclopaedia on Bert Hinkler. The ceremony was held in the Botanic Gardens at the rear of the Hinkler House, a scene that would have been familiar

Ibis on its stand in Historical Society Museum. Pilots door is open. Nose has bumper strip.



Hull of the Ibis - or should that be fuselage? - showing simple framing. Upside-down, of course.



Assembly of the framework components. A very satisfying moment for the author; but still a long way to completion of the project. Covering was the full-sized version of Koverall.

The Ibis cockpit. Note brass magneto switches and dual throttle controls. (The throttle controls are the only surviving parts of the original Ibis, and are in a glass case at Hinkler House.)

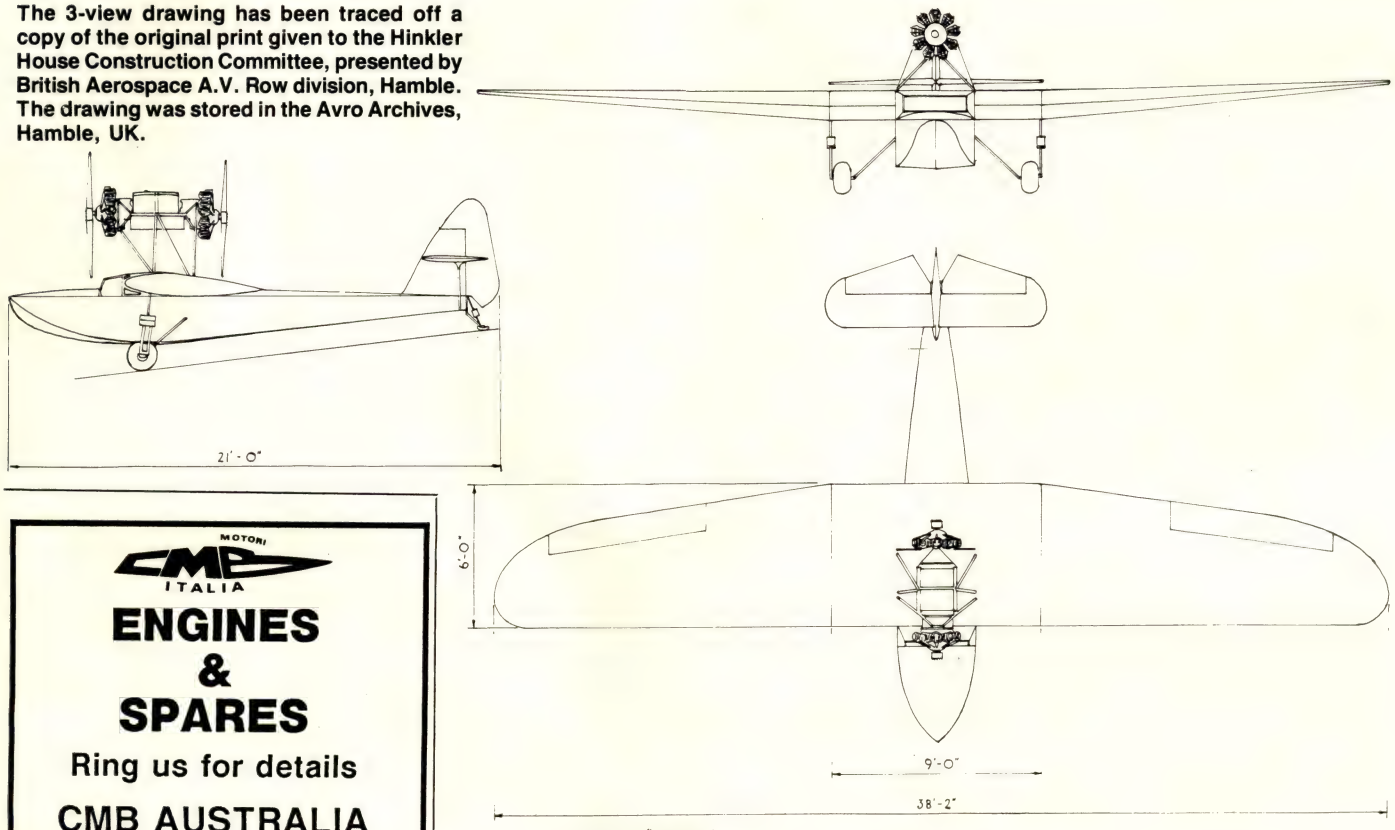
60 years ago when Bert built the Ibis at his home in Southampton. The ibis birds still populate the water regions in the area where the gardens surround two large lakes filled with water lilies and, as the band played "Those Magnificent Men in Their Flying Machines" a flock of ibis circled overhead in perfect sunny Queensland weather.

The project took approximateky four years, from the start of drafting the working construction drawings to mounting the replica on its stand in the Historical Society Museum. There it shall remain, on permanent display, as a tribute to one of Australia's great aviation pioneers, Bert Hinkler, and to his 'dream machine', as he often referred to it.

A great deal of thanks must go to all who helped in the reproduction, and may they reflect a sense of achievement in recreating a piece of history in raising the Ibis from the ashes.

Congratulations to John, who built the IBIS, and to his supporters and sponsors for a fine achievement. John and Arthur Bugden produced the Airborne plan of the Avro Avian, EBOV, and with the completion of the Ibis, John becomes another of Australia's super king-size modellers.

The 3-view drawing has been traced off a copy of the original print given to the Hinkler House Construction Committee, presented by British Aerospace A.V. Row division, Hamble. The drawing was stored in the Avro Archives, Hamble, UK.



THE "IBIS"

SPECIFICATIONS OF THE IBIS

Wingspan:	**38 ft 2 in**
Wing Chord, Centre Section:	**6 ft**
Length:	**21 ft**
Engines:	**2 Salmson AD9 40 hp 9 cylinder radials**

PHOENIX RADIO REVIEW
Ibis 2 Channel System

In the good weather of late May, the Ibis 2 channel radio set was tested extensively as a follow-up to the testing of the excellent 4 channel Ibis system. The 2 channel set gave a flawless performance, just like the 4 channel set.

The system was tested in a motor glider with rudder and elevator controls. At the same time, a similar model with a 2 channel set with a top-reputation brand name was flown for comparison. This second model behaved well and showed nothing unexpected in the performance of the radio control set. However, the model with the Ibis set was more enjoyable to fly. The actual flying performance of the Ibis controlled model was little different, but the comfort and precision of the Ibis control was noticeably better.

The transmitter was easier to hold, particularly for long flights, and even with a neck strap the thumbs-on-top style of touch was not impeded in any way. The special feature of this set, the 2-position elevator stick was used to good effect. The stick may be adjusted by a switch, separate from the trim lever, but similar to it, and the forward switch position was used for the climb phase of each flight. As soon as the engine cut out the switch was moved to the rearward position, which was just right for the gliding phase. The different angle of the elevator stick between the two phases was not noticeable. The servo responses were fast and precise. The tiny control movements needed to nudge the model into a thermal were obtained as easily as the full-deflections needed to combat turbulence just before touchdown, and so avoid a wing tip landing or a stall.

Some battery checks showed that the nicads available with the Ibis sets give service as good as those in the best sets from other manufacturers. With welded batteries and a press stud connection between battery and the transmitter circuit, there is nothing to criticise about the Ibis radios. The airborne connectors are well tested and proven.

The excellent performance of the Ibis radios is where it is needed: between stick and servos, not in bells and whistles.

Motor glider used to test the Ibis 2 channel radio. MVVS 2.5 cc diesel, 9 ounces per square foot. Excellent control from the hand to a range of more than one kilometre.

The Airborne Engin·ear

by Brian Winch
33 Hillview Parade,
Lurnea, NSW, 2170

Please include a stamped, self-addressed envelope for RAPIDWINCH replies, and print your name under your scribbled signature.

THE OZ COLLECTIVE

Something new! This is or should be of concern for every modeller in Oz as you will reap the reward. First, my usual build-up with a little parable.

My dear, departed father-in-law worked most of his life for a large hardware company. He was one of the old school of shop assistants who took great pains to please the customer. He often regaled the family with amusing anecdotes of assistant-customer relations, and my favourite, which indicated the perversity of some, concerned the cement worker's tools. "An Italian worker would come in and ask for several types of cement worker's hand tools. Before I could ask what brand he would say with some venom in his voice 'Don't give me any of that Italian s..t stuff either. I want the good Aussie stuff.' When an Australian wanted similar tools he would demand 'Gimme the good Eytie stuff. I don't want Aussie crap.' "

Does that strike a bit of a familiar note with you? Buy foreign and to heck with the home market?

The Overseas Syndrome

For sure there is a diversity of products available in the USA, England, Japan and, sometimes, the price is lower than here, but consider the population buying power. Also, those three countries mentioned benefit from devoted patriotism of the population. 'Best of British' is said with pride by the poms, 'America invented it and makes it best' is the boast of the flag waving yanks, and 'Ying tong tiddle eye po' means the same (or similar) in Japanese. With consumer backing like that a manufacturer has a hand-up start.

Well, the kangaroo has jumped into the ring and is spoiling for a fight. I have a group of Oz manufacturers and dealers in Oz manufactured goods breathing down my neck to back them up by presenting to you a sample of their wares. **MY** criteria are that they produce the best quality possible and keep the prices as low as possible. The answer is in the affirmative by all concerned, with the rider that quality in some lines will be the best at the time with improvements as experience is gained, and prices will be as competitive as possible in line with the volume of sales. These two riders depend on **YOU.** If the product from the line that I advertise is not up to the standard you expect, let me or the manufacturer know straight away. Don't whinge to your mates. They can't do anything to help you. If the manufacturer does not know of your displeasure he cannot provide the quality you want. The price depends on the amount YOU purchase. We have the highest wages overall in the world and the smallest buying population, so it is hard to get prices down low. Our land mass is about the same as that of the USA. We have about 16 million people; the USA has about 196 million. This gives them about 180 million more purchasing people than we have, and that is a tidy amount if you are making a dollar profit per sale. Thing is, in the States profit is often worked out at fractions of a cent per item sale. That little 180 million makes quite a difference.

It's up to you people. As time and opportunity allows I will review a range of products from the collective that I have on hand and have tested in some way. My opinion is that the products represent value for money, as my criterion is, and always has been, if a product doesn't come up to scratch don't mention the product at all. Actually, if a product does not meet my criterion I return it to the sender with my constructive comments based on my findings or what a circle of my modelling friends think about the product.

BRING ON THE GOODS

In past issues of Airborne, and in the latest Aeromodelling Digest (get yours NOW! ... see advertisement this issue) I have presented to you the products of Old Fashioned Hobbies, which is under the hand of Alan Trinder. Alan is a member of the collective, and no fair-minded modeller could honestly say that his products are anything other than excellent. I have also made mention of Peter Bons of Scale Aviation, more of him later, and Barry Murphy briefly. This issue I am presenting a larger pictue of Barry Murphy and his company, Western Flying School.

Product P36 - Rigging Cable

Galvanised, high tensile steel cable for wing and tail rigging and closed loop control systems. This cable is of superior strength and is very easily soldered if needed. It comes in three sizes: .9 mm for lightweight rigging and control systems; 1.2 mm for medium rigging jobs; and 1.5 mm for the biggies. The package of 5 metres would be enough for anything other than the Wright Flyer.

Product P37 - Nylon Tubing

This rigid walled nylon tubing does a great job as a water pick-up in boats, as an outer tube for the flex cable and any situation where you need a friction-free, flexible tubing for moving or still inner cables, rods or lines. Use it to route your antenna and throttle cable. It comes in 5 metre lengths with a bore of 3.2 mm.

Product AP07 - Flex Cable

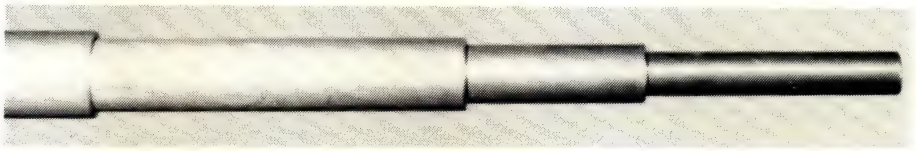
Combination of P37 and the 1.5 mm cable ready to make up for throttle or front steering control. Fits popular connectors.

Product CP35/1 & 2 - Antenna

Choose either a sprung metal rod antenna with a threaded base or a tube antenna with a threaded base if you want to use the wire antenna from your receiver. The base is threaded aluminium with a fibre washer and and nylon nut. Boats and cars are under safer control with either style of antenna.

Product A41 - Flik Stik

A 200 mm long starting stick for engines. Commonly known as a chicken stick. The plastic tip on the propeller end is relaceable. This unit is the best I have used, as the firm plastic gives good engine feel. Save a finger or two.



Telescopic aluminium tubing has many uses in modelling, and this range is strong enough for the most demanding usage.

Product AP38 - Telescopic Aluminium Tubing

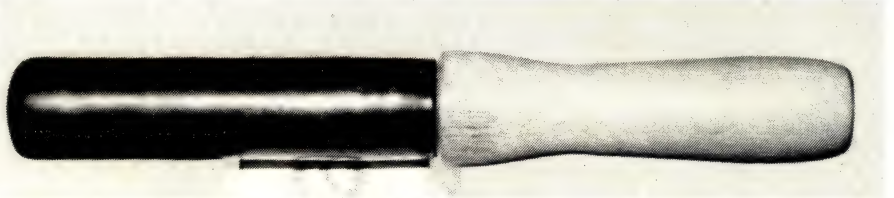
Four diameters of aluminium tubing with outside diameters of 19, 15.9, 12.7 and 9.5 mm and inside diameters of 16.1, 13, 9.9 and 7.7 mm, which gives a good telescopic fit throughout the range. Ideal for wing joiners and braces, and just the answer for telescopic undercarriages and other projects where aluminium tubing is required. Available singly or 2 tube packs in 300 mm lengths.

Product AP081 - Resin Powder

This is used for giving body to resin when joining or building up fibreglass work such as securing a firewall in a fibreglass model. It makes resins thixotropic, which is non-runny, like peanut butter. Comes in 125 ml bottles.

Product A06 - Wing Sheeting & Finishing Epoxy Resin

Used for skinning foam wings, glassing woodwork, setting up glass cloth and carbon fibre, fuel proofing engine bays or any application requiring a finishing or surface resin. This is the easiest-sanding, smoothest-finishing resin I have ever used, including that expensive red, white and blue USA product. Mix 2:1 with the supplied hardener using the stirring stick and the mixing cup, both of which are supplied in the kit. The kit contains 350 ml of resin.



Keep your fingers where they belong - on the ends of your hands. The FLIK STIK will help you in this regard, as well as starting your engine.

Product P083 - Micro Balloons

Superfine, ultra light micro balloons for mixing with resins and glues for building-up surfaces, filling faults and forming fillets. Excellent quality in 225 ml jars.

Product A02 - Carbon Fibre Tape

Strengthen that wing spar, or re-inforce that joint with unbreakable carbon fibre. A good mate for the finishing resin. Don't break it - tape it! In one metre lengths of 25 mm wide tape per pack.

Product 31D - Gap Filling Epoxy Paste Adhesive

Fillet-forming, super strong adhesive that won't run off the job. A peanut butter consistency (smooth variety, of course). Ideal for applications where a fillet type joint and re-inforcement are required, such as firewalls (use in place of triangle stock) or wherever bulk or build-up is required in a glued joint. Won't run while curing.

Product B026 - Plastic Edging

This is sold for edging the hull on model boats to avoid 'pier bruising'. Mariner modellers will also see a use for coamings, and I see a use for cockpit edging for aircraft. Your heat gun softens it for sharp corners and it resets tight and firm. Packs of 3 metres.

Product A03 - Foam Brushes

This falls into the category of 'Why didn't I think of that?'. A 7 x 7 cm pad of 15 mm soft foam that is the best resin applicator that you will ever use. Cheap as chips, so throwing away the used 'brush' won't make you moan. Packs of 5.

Product - Exhaust Tubing

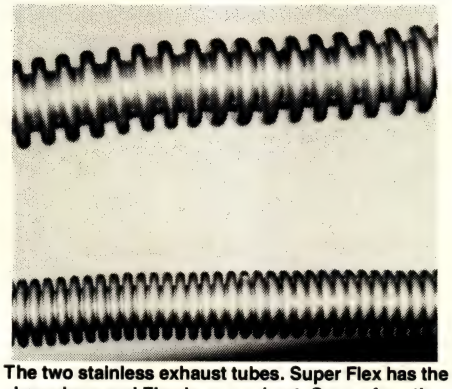
A stainless steel, flexible exhaust tubing to take up to 600°C (engine meltdown point). I have made up quite a few exhaust systems for customers since Barry introduced this product, and it sure solved many of my headaches. Route the exhaust where you want it to stay, and forget it. No shakes or melting. Four-stroke modellers will love this. Make mufflers from the larger diameter. Silver soldering is a snack. There are two types - Flex and Superflex, with the latter being used for really tight bends. Available in 9, 12, 15 & 19 mm inside diameters and sold in multiples of 10 cm lengths.

Well, how do you like them apples? Just a sample of the products available, and all good Oz stuff. Next month I will give you a full review of the AIR SHRIKE - the hottests air boat you have ever seen. Turns with the hull at 45° to the water surface, and spins in its own length at full speed. More fun than you have ever enjoyed in modelling.

Quite a few model shops are beginning to stock WESTERN FLYING SCHOOL products, so ask at the shop where you get the best service. If they don't have the products, tell them to get on the ball, and you can get on the phone to Barry Murphy or one of his friendly team on (02) 622 9996, or treat yourself to a visit to Unit 1, 31 Forge Street (on the bend in the road), Blacktown, 2148. Mail orders promptly attended to.

CAN YOU FILLET?

Wing and tail fillets are a time-consuming job and fraught with frustration when they don't go the way you want. How about a ready-made job that you just cut to length and stick on? Sounds too good to be true, doesn't it? Garry Kellett of Kellett's Hobbies laid a 1200 mm length on me with the challenge to find a better way. No chance! This ready-made fillet is some type of flexible yet firm plastic that is feather edged and ready to be installed on the model. Stick one end down with CA (Zap, Hot Stuff etc.) and lay the piece in position while following up with more glue. Difficult contours are a snack as the fillet is softened with a heat gun. When in position the ends can be carved and sanded to shape and any paint will stick to the surface. A finished job that looks like hours of intense labour. I used some for a wing saddle by covering the wing with Gladwrap and gluing the fillet material to the fuselage side. Well known FOURMOST brand and in large and small section at a price way below the material and labour costs of a built-up job that will probably fall off or crumble with the first loop the model performs. Ring Garry's gang for your length.



The two stainless exhaust tubes. Super Flex has the close rings and Flex is spaced out. Scope for other projects with some thought.

ERLS AIN'T ERLS

Back on the lubrication soapbox! You blokes sure cause me some hair tearing moments. Every so often I get a report of some new oil that is going to solve all our lubrication problems. "What problems?" I ask. Let me go right out on a limb and say that unless the oil is specifically designed for use in model engines ranging from the Cox .010 to the Super Tigre 60 cc (I think that covers the entire range) it is not overall suitable for model engine use. I have to keep on reminding some of you of one factor: in the main, model engines have plain bearings on the conrod and they are run at top speed for most of their lives. As it is, the oil is highly diluted with the fuel content of the mix before it reaches the bearings, so it has to really perform to be up to the task of keeping everything running smoothly.

Throttle Benders

The current scuttlebutt is that the RC car fraternity have this magic oil that works quite well at 8%. Not for me Charlie! If you can afford to replace engines regularly then go for it. I have quite a few car engines sent to me for 'repair as necessary' and, to date, every one needed new moving internals as the ones in the engine had been chewed out due to lack of lube. Before you put scathing pen to paper, let me qualify. No doubt some of you throttle benders have great joy with this oil at the low rate due to the fact that you are tuning the engine correctly. Consider a lean run. Before the car does one lap of the track the engine is finished. Another factor is that the engines in cars are run up and down throttle - sort of 'Blarrrrp' down the straight, throttle off, 'Blipppp' round the bend, short blarrrp, two blippps and so on, which gives plenty of cooling and the engine in understressed as it has plenty of off or low periods of running. Not so for most aircraft. Mostly 'Blarrrrp' from take-off to landing.

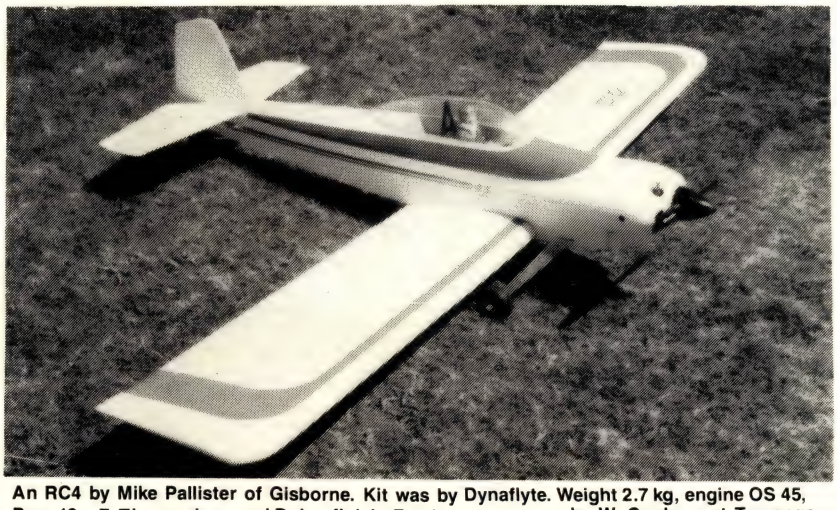
We don't have problems with lubrication!

Castor oil is perfect for our use and will take all the abuse you can hand it way beyond any other lubricant. After hundreds of repairs and a lot of re-evaluation in the last two years, I am now going to tell you to INCREASE the oil content if you want the engine to last for many hours of trouble-free running. For two-strokes you should use 22% castor, and 18 to 20% for four-strokes. Blends of synthetic and castor are fine providing that you keep the ratio equivalent at the same percentages. Whatever your argument or however long you have been running on a mingy percent of 'Blekko' (whatever) synthetic, I guarantee that your engine won't stand the abuse or tolerate a lean run on your blend as it will on a good, thick castor brew. Yes, I know - yuk on the model. So what? Don't you carry a bit of rag and some metho? As has been said for many years "If the oil's coming out the pipe it's sure going through the engine", and that's what it's all about. If you're still not convinced, check out the price of a new engine these days.

THE END PRODUCT

Well, as the curtain drops and my typewriter sinks slowly in the west, I'm off to tech for my latest venture in the vagaries of TOWN PLANNING. I have already learnt that the further away from each other two places are, the greater the distance is between them.

Tom Foolery



An RC4 by Mike Pallister of Gisborne. Kit was by Dynaflyte. Weight 2.7 kg, engine OS 45, Prop 10 x 7. Tissue, dope and Dulon finish. Futaba radio. Photo by W. Cooksey at Tauranga.

THE WORLD'S BEST SHRINK ON COVERING MATERIALS
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Now available a new technology in polyester film which makes all other polyester coverings obsolete.
It combines the best of both low temperature and high temperature films. It is a mechanically advanced polyester film coated with a special easy to use multi-temp adhesive.
It can be supplied with high heat and requires no special instructions to produce superior results. It is the ideal material for special low heat applications like foam wings, fibreglass accessories or canopy attachments and trimming. This is a film for advanced modellers but beginners will also love it for its forgiving nature.

SOLARKOTE SPECIFICS:

- A true multi-temp film - use an Eagle Imex iron at low temperature 110ºC to 130ºC and high temperature 130ºC to 150ºC.
- SOLARKOTE is not stiff like other polyesters it goes around corners with less creasing, but if you get one, it comes out very simply with an iron or a heat gun.
- Shines like a high gloss paint job - not like plastic.
- Lighter than other polyesters.
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- Adheres tenaciously to wood and to itself.
- Unaffected by glow fuel, diesel fuel or gasoline.

Test marketed successfully by Graupner in Germany and now by Coverite in the United States as 21st century space age film. According to Coverite this is the film we've been waiting for.

SOLARKOTE

Is available in 2Mx27" and 10Mx27" rolls in 14 colours: White, Light Yellow, Dark Yellow, Orange, Red, Pastel Blue, Pastel Green, Light Green (F), Flag Blue, Black, Heather, Violet, Lux Blue and clear.

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Super light fibre reinforced polyester film in six colours including aluminium. Recommended for gliders, Sailplanes and electric powered. Available in 72 inch rolls.

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Fuel proof aircraft paint in 13 colours. Colour matched to SOLARFILM and SOLARSPAN. Mixing chart recipes for ten additional colours and 33 camouflage colours in combination with matt finish - 110ml jars.

CLEARCOAT

A clear gloss fuel proof finish in 110ml jars and 500ml tins.

BALSALOC

Super heat seal adhesive for all iron on film. Must be used with LITESPAN AND FIBAFILM. Especially suitable for foam wings. Available in 110ml jars.

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COX TEST "KING" TEX & QUEEN BEE

by Brian Winch

THE BIRDS AND THE BEES

A couple of months back I reported on the re-introduced Cox .010 engine, and I made reference to a cockroach doing naughty things to it. I don't want you to think that I'm obsessed with **that** topic, but I am going to give you some information on the habits of bees. This is simply to unravel the mystery of how those little .010 engines are made. Sit quietly and don't wriggle while we study what comes naturally.

In the divine plan for all creatures, without the intervention of man, nature ensures that only the fittest survive. With bees, only one in the hive lays eggs, and that is the queen. Each morning in summer, at about 1000 hours, the queen flies out of the hive and spirals upwards at speed to a considerable height. The mating males follow and only the absolute fittest can keep up with her and, in the air, they ... err... mate (excuse my frankness). As such, the progeny are from the super queen and the fittest male, and they become top performers in the bee society.

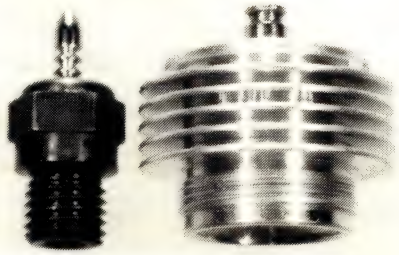
Well, there you have it! The Cox company sent me two more engines for testing (they refuted the cockroach theory), and these are the **QUEEN BEE** and **KING TEX.** (Actually, the second one is a Texaco but, after reading the report, you will agree with me that it is king in its field.) Now, I'm not suggesting that these two engines do **things** in the air, but there is an odd comparison worthy of thought, and those little .010s have to come from somewhere!

QUEEN BEE & KING TEX

The Queen is a delightful little engine in the Cox tradition of superfine quality in miniature. Over the years the Cox engines have been used for a wide range of models, including ready to fly control line models, free flight, small radio control models and lift engines for sailplanes. One specific use that is popular in England and gaining popularity in many other countries is the schoolyard flyer. This loose term is applied to a very light model of moderately small dimension and generally of the S.T.O.L. (Short Take Off and Landing) configuration. A small engine is used and the model is flown in small areas, generally after work or at other odd moments when there is not enough time to go to a flying field. The general requirements are that the engine is reliable and easy to start so that just one small battery is needed (for glow engines) and half a squirt of fuel for half an hour's fun before supper is on the table.

Because of the areas used for these little escapes (or escapades) you have to consider reliability of radio and quietness of engine, and the latter has been a bit of a problem in the past due to lack of mufflers on the little beasties. Well, the problem is now non-existent as the Queen Bee has a very functional muffler fitted and, to take care of another problem of flying the tank out at top speed, she also has a fully functioning throttle carburettor. Couple this with the latest radio receiver I have just seen from Hi-Tec that is smaller than the smallest servo I know of, and you have the start of a real fun combination.

Her royal smallness has a number of other interesting features, including a standard type glow plug (cool range), reversible carburettor to suit servo linkage or cowling and a reversible throttle so that you can push or pull on or off to suit your needs. It is an ideal engine for the established modeller with a need for a top performing small engine and especially good for beginners in both flying and engine work.



Ignition for both engines. The Queen Bee uses a cold range normal plug and Texaco is fitted with a Cox style plug but with five fins for cooler running.

It is the first engine I have had where the manufacturers actually encourage you to pull the engine apart at intervals for cleaning purposes. The instructions and diagrams with the engine give you all the information of how to clean it and reassemble the parts for continued performance. This is a good place to start if you wish to get into the engine fiddling side of the hobby. If you make a blue and damage some part you don't have to throw the lot away as every component of the engine is available as a spare part at a very low cost. This stripping down bit also applies to King Tex.

The Bits of Both

The head of the Queen is much like the usual Cox head in shape with one exception. Where the plug is normally an integral part of the head, the Queen has a bored out head to take a standard type glow plug. I don't know why they did this other than perhaps it has something to do with the idle characteristics considering this is a throttle equipped engine. At low rpm I imagine the aluminium head would cool off quickly and in doing so would act as a heat sink and cool the glow element whereas the steel body of the normal plug would retain heat to advantage. If you blow the original plug you will need a thin wall tube spanner to remove and replace the plug and, if you don't have a Cox replacement, use a plug in the cooler range. I don't know if the plug fitted to the test engine was faulty or whether they are a little critical of voltage as mine blew out immediately on connecting to the plug driver on my test bench. The setting is the same as I use for most plugs and I have used it many times since without problem. If you have an adjustable power source for your plugs you might consider setting in on the low side to start off when you try your engine.

The head on the Texaco engine is of the integral plug type but is different from the norm in that it has five cooling fins rather than the usual three. This keeps the head temperature way down, which is one part of the design for economy.

The cylinders for both engines are finely machined from alloy steel and have the two row slit exhaust arrangement. Finish is shiny black oxide on the outside and the absolute epitomy of excellence in engineering on the inside. When engines of such small size as these are made to perform the fits tolerance and surface finish has to be absolutely perfect. The bore has to provide a very tight seal, maintain a film of lubricant, be absolutely parallel and still allow the piston to slide freely up and down at 17,000 plus rpm; no mean feat. You can't achieve that with a pistol drill and a round file!

The exhaust ports on the Texaco are al fresco - in the open air - but the Queen maintains her decorum by sporting a very neat muffler in two piece aluminium - a manifold secured by the cylinder screwing into the maincase and the silencing body located onto and secured to the manifold by two bolts. The muffler position can be changed around a bit to suit installation by slackening off the cylinder. There is an appreciable lowering of the exhaust volume noticeable when you run the engine with and without the

muffler. With the muffler body removed there is quite a high pitched bark that is changed to more of a reedy buzz with it replaced which is more in line with a queen bee sound.

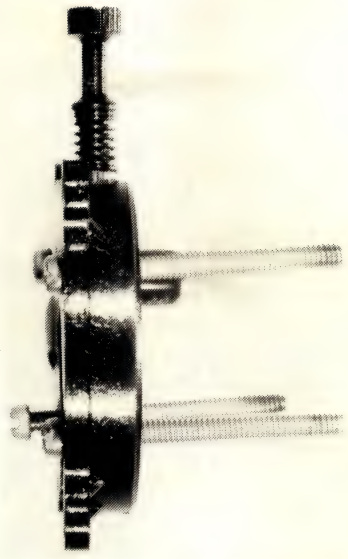
The piston and rod combo is traditional Cox - steel piston with an inner skirt that is swaged around the ball little end of the conrod. On the piston is the same high grade finish as is found in the cylinder. The top of Cox pistons are copper plated and I can only surmise that the reason for this is anti corrosion; less inclined to hold carbon and better distribution of combustion heat across the top of the piston. These are Winch guesstimates only. The little conrods used in these *engines* take quite a beating with the speed these engines are happy at, and I have seen them take a real flogging at times with props poorly fitted (see 'Shaft and Prop Driver' later) and totally unbalanced yet they hang on, taking loads of punishment for many hours of use. A tool can be purchased from Cox for tightening the skirt in the piston around the ball end after a few hours use. I made a quick, rough unit some time back that did a reasonable job (I have about a dozen Cox engines), but I must get around to buying the factory made unit one day, and I advise you to do the same if you are serious about maintaining your little engine gem.

There are some differences in the valve setups of these two engines to suit the designed use. The Texaco engine has a different holder to change the fuel flow in line with the economy running design. This engine also has the typical built-in tank with a capacity of 8 cc. The needle valve is again typical Cox set into the rear top of the tank. This section of the tank, now polymer, is also the radial mount.

On the rear (pardon my frankness) of the *Queen* is a very smart, partial downdraught, throttle style carburettor. The complete carby is mounted onto a manifold that is also the backplate and reed holder retainer for the engine. According to your needs, the carby can be rotated 180° to change the needle position from one side to the other. The throttle arm can also be moved around to suit servo linkage.

One idea that should be picked up by manufacturers of some of the very expensive, exotic engines is the built-in air filter. Not only does it filter air, it also stops little boulders and other nasties falling into the upward facing carby opening. I have just designed, built and fitted a similar unit to a YS Yamada 4-stroke engine and it gave the owner great peace of mind.

There is an idle stop screw on the top of the carby body to set idle speed. One other nice little touch is the teardrop shape of the main needle adjusting knob. Easy to handle and a snack to count the turns or move 'just a tad'.



The needle assembly of the Texaco is also the air intake, tank retainer and engine mount. Air filter is also incorporated.

The crankshaft in both engines is of the full disc design and the mainshaft has the centre bearing section relieved to reduce bearing drag. In essence, there are two bearing surfaces on the shaft: one against the disc; the other behind the prop driver. Again, superb engineering as would be expected of this company and for this very important engine component. The prop driver on both engines is a snug fit spline drive on the shaft.

For some reason the Queen prop driver is round while the Tex has a hexagon unit. A nice touch is the prop centering hub; standard fit on the Queen, and extra (supplied with the engine) on the Texaco. I made reference to this in the conrod section and here is what happens. Modellers who don't know better will often fit other than a Cox propeller to a Cox engine, and therein lies a problem. The prop shaft on these engines is a 2.5 mm diameter bolt that screws into the crankshaft. Most of the small props available have a 4.7 mm diameter hole which is a rattling good fit on a 2.5 mm bolt. The prop so fitted will flop around in a state of considerable imbalance. Cox now provide a centering hub - they call it a prop centre - to eliminate that particular problem and also to provide a very snug fit for their own purpose-designed Cox props. The prop is retained by the aforementioned bolt going through a spinner shaped washer to give a nice faired appearance to the front end.

The Bottom Bits

The maincase - crankcase - of Cox engines is a bit of a trademark in that it is an extrusion - a bar shaped to the largest profile. Set lengths are cut off and the ends machined as desired. This is so for the Texaco, but I am not sure as far as the Queen is concerned. Here we have a departure from the norm with the small engines in that there are side mounting engine lugs as opposed to the radial mount generally used on the small engines. The case looks good enough to be an extrusion or superbly machine from solid. Who cares? So long as it does the job. (Err ... it does!)

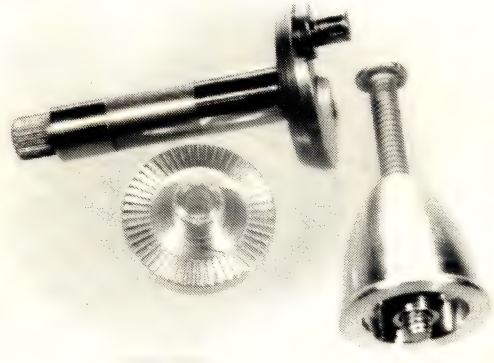
As is common practice, both the engines are reed valve induction. This principle of induction is simple and excellent and I don't think there are any limitations as far as operating speed. In the crankcase of the engine is an aperture to allow the mixture of fuel and air to enter. The entry is blocked by a flat plate of some very light material - mylar, GRP, stainless steel, nylon, beryllium, copper to mention a few. The plate is the reed and is free to move backwards and forwards within the confines of some form of restriction. As the piston rises a lower - sucking - pressure is generated by the up-stroke. The suction draws the valve open and sucks fuel through the aperture. On the down-stroke of the piston a higher - pushing - pressure is generated and this closes the valve. This can happen many thousands of times a minute without fatigue or falter. There is only one minor disadvantage and that is that the engine runs equally well in either direction, and even that is not really a disadvantage if you have a use for it.

Other Bits

The only other bits left now are the tools supplied, the props and the engine mounts, so let's have a peer at these.

The punched-out multi-purpose tool supplied with Cox engines is an all round winner. Actually, there are two of these tools supplied with each engine and, with these 'do alls' you can completely strip the engine, change plugs, tighten or loosen the prop, open crown seal drink bottles and kill cockroaches. (I used one to kill the cockroach that raped my little .010 engine.) Yes, there IS a screwdriver bit - you will find it on the pointy end near the 'C' spanner section on all except the Queen Bee. (I filed the square end of the Queen spanner to fit the prop screw so that I don't have to carry any other tools for a quick fly in the school field.)

These are the new parts fitted to the Queen Bee. All components are in the usual Cox tradition of excellent engineering quality.



The crankshaft with fittings. The relieved bearing area on the shaft reduces friction drag and helps prevent barrelling of the bearing.

Only a few propellers achieve fame as the brand becomes a household (fieldhold?) name. Taipan, Bolly, Zinger are in the elite group, and in the small engine circles the Cox grey is a member of the clan. These props are sturdy, true-running, extremely efficient and ideally suited to the engines for which they are made. I received four for testing with the engines, and each one tracked perfectly and balanced spot on. These props are purpose-designed or, the now 'in' word - dedicated - to Cox engines, so why bother trying others?

The engine mount is only for the Queen, and it appears to be made of the same material as the props - fibre re-inforced plastic. A nice looking unit complete with screws, washers and Nyloc nuts and drilled for the engine and firewall mounting. The Queen has to sit out a bit due to the rear carby, so the arms on the mount are the applicable length with angle gussets top and bottom for total support. Yes, the engine and holes matched perfectly, in case you were asking.

Royal Command Performance

You need to be an old hand at flick starting small engines to better the Queen. If you're not adept at this you soon learn as it takes a good, swift spin to get a tune from this little beastie. If you don't get the prop over smartly the piston just oscillates up and down without going over top dead centre. This is a bit akin to a reluctant donkey in a cart - can't make up its mind whether to go forward or backwards. Apart from needing a smart flick, the starting is greatly improved when the plug is not lit up like a street light. I found that by turning my plug driver down until the plug was just a recognisable orange, the engine hand started quite readily. The reason for this is that the high nitro fuel, coupled with a bright plug causes greatly advanced ignition and there is not enough weight in the reciprocating parts to get the piston 'over the hump' as it were. The plug is quite cold so it is not designed to run like a miniature oxy torch inside the head. Another way to get instant start is with the Winch 'lec starter - a 450 cheapie electric motor, mini rubber cup drive and nicad battery pack. Ideal for all the little reed valve engines - instant start and always the running direction you want. I ran the Queen on 12½% Magnum fuel and 25% Winchbru, but lower nitro content can be used with a change of head gasket thickness. Transition was surprisingly good for such a small throttle equipped engine, and the idle was steady and reliable. Ideal for powered sailplane type models; idle the engine until the model starts to lose altitude then give it a little burst to gain height. On 10 cc of fuel the engine ran for 2½ minutes at full throttle with the 7 x 3.5 prop. On test, the following figures were recorded:

12% nitro fuel, 22% castor

7 x 3½ Cox grey prop	10,800	idle 4,500
6 x 3 Cox grey	14,500	

25% nitro fuel, 22% castor

7 x 3½ Cox grey	12,900
6 x 3 Cox	15,900

The rpm could be pushed much higher using a blend of synthetic and castor oil to lower the viscosity. I used the usual Magnum mix as this is availabvle to all modellers and certainly safe in terms of keeping plenty of oil going through your engine.

No Frills Performance

The Texaco was altogether different in that it started first flick out of the box and continued to start after one or two flicks every time regardless of the fuel used. Of course, you pay for this in that there is no muffler and only two speeds: flat out and stopped.

The figures here are very interesting and need to be read more than once to see the odd factor and what is best for your needs. All tests were with the Cox grey 7 x 3½ prop, as this engine has considerable torque as is needed for Texaco events as well as lower rpm to conserve the fuel. Check these surprise figures. (8 cc of fuel used for the time test.)

25% nitro, 25% castor Winchbru
10,400 ... 3 minutes 50 seconds
Morgan 15% nitro, synthetic oil
9,000 ... 3 minutes 40 seconds
Magnum 12% nitro
10,400 ... 4 minutes
Magnum FAI 4:1 (no nitro)
10,000 ... 5 minutes 15 seconds

All you field chemists can try your own killer blends but, if I was giving advice, I would say that a little bit of fiddling with the straight methanol-castor ratio would be the way to go for maximum ergs on minimum drops.

The Last Word

Two little gems for the lightweight fraternity: one ideal for schoolyard cruising; the other for cloud bouncing. Use them as you will; you won't find either wanting in performance, quality or pure enjoyment, and, most important these days, no painful extraction from the wallet.

The Cox Queen Bee was reviewed in Airborne No. 94, July-August 1989, page 35.

The Cox Texaco was reviewed in Airborne No. 98, March-April 1990, page 74.

Cox engines and spares are imported by Southern Model Supplies in South Australia.

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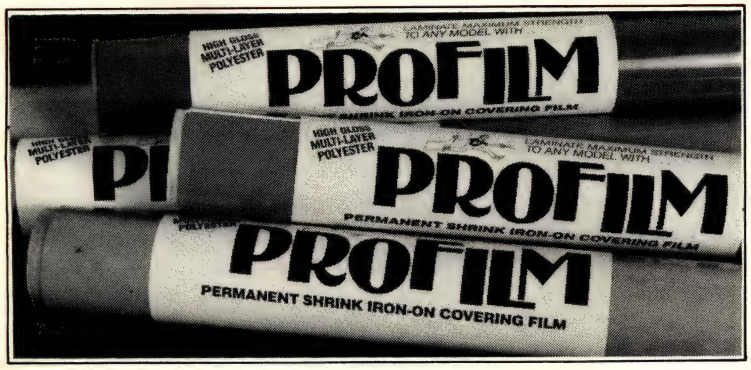

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MODEL ENGINES

57 Crown St., Richmond 3121, Vic.

For Old Timer Sake

by Colin Borthwick

There are those who indulge in model railways and pretend that they are at the throttle of a fire-breathing, snorting steam-powered engine.. Some even wear an engineer's cap, so I'm led to believe. There are also those who fool around with model boats, using all the full-size words and phrases, pretending to be the skipper of a PT boat or, as the bug bites deeper, they progress to the ultimate, an aircraft carrier. There are a variety of modellers who indulge their fantasies for exotic cars or motor cycles or, since the recent Gulf War, Scud Missiles. faithfully molded in plastic by the manufacturer and assembled and decorated by the modeller.

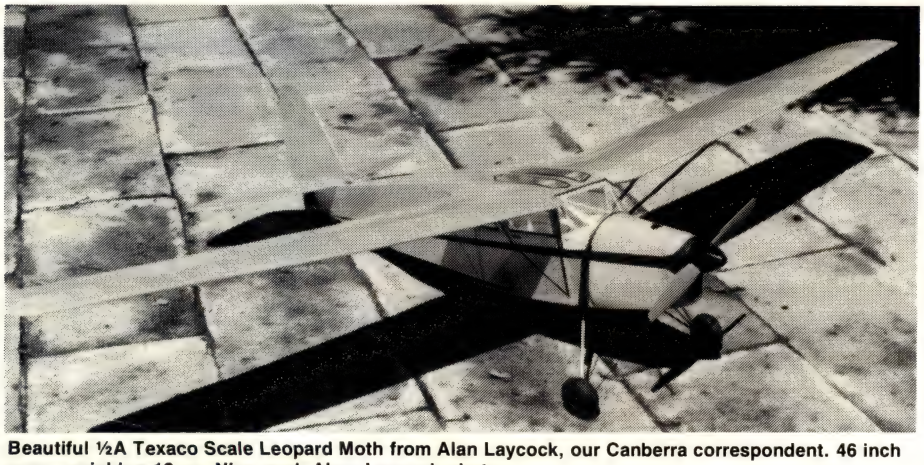
Consider how fortunate are we, having been indoctrinated into the best hobby of them all: the building and flying of model airplanes. Our hobby gives us much more than most other divertisements. We have a unique hobby-sport. We have alone, as one critic of our chosen form of relaxation once declared, the ability to indulge our fantasies in three dimensions. We also have that same freedom to have an accident.

Three dimensions is a lot of freedom in which to wreak havoc. Model cars might hit your foot; model boats your hand; and, there are reports of model trains jumping the rails and inflicting severe damage on owner or onlooker. Our freedom in the three dimensions brings a degree of responsibility unknown to most other hobbyists or sportspersons, with the possible exception of the javelin thrower. Always fly with care. A power model is somewhat akin to a loaded gun: never point it unless you intend to hurt someone. As none of us has that inclination, the bottom line is obvious: never point a model at a human being, or he may very well cease to be.

As these words are being read, in the main by builders and flyers of Old Time models, do not casually dismiss these words of caution lightly saying "Our models do not fly that quickly, and consequently will do little damage." I have been around model airplanes long enough to realise that all models have the potential to injure, regardless of velocity. Sometimes it is not a matter of what they hit, but where they hit it. I mentioned in a previous issue that there is a movement in the US to impose a ban on all propellers except those made of wood. I believe that this proposition is flawed. It seems to me to matter little what the composition of the propeller is. The real question is: how fast is it turning at the time it hits some portion of a human being? I am more worried (to be honest, I am terrified) about a .21 turning a 7 x 4 at around 20K than I am about a .65 turning a 12 x 6 at half those revs. Perhaps it is the thought that I have been cut rather badly by a little scalpel blade and have been merely bruised by a large, fibre-filled nylon propeller.

The joy of winning! Des Slattery, winner of the SAM 84, the Vintagents, Tomboy Day. Des has just been told that he won. Photo taken by John French.

I have another problem concerning rules designed by well-meaning modellers to save us from damage. In my experience you cannot legislate against issues that the people involved do not see as serious problems. Cut your hand tomorrow (please don't, or you might suggest that I jinxed you) and it will smart and perhaps spoil your day, or even several days. Chances are that you will do the same dumb thing next week or the week after. In general, modellers are optimists, and most of us possess what was known in 1914-15 as the 'French Mentality': "The man beside me might get himself killed, but it will never happen to me." I ask you to stop and think whenever you are on the flight line, surrounded by engines ready to be unleashed and all spinning meat cutters up front. Stay cool, never move suddenly, and remember that the thing for which you paid $4.50 can and, given half a chance, will cut you badly. This will happen regardless of whether the $4.50 item is hand carved out of wood by a group of intelligent



Beautiful ½A Texaco Scale Leopard Moth from Alan Laycock, our Canberra correspondent. 46 inch span, weighing 13 oz. Nice work Alan. Laycock photo.

Tall Texan, Murvil R. Lipsey Jnr., poses with his 109 inch Westerner powered by an O&R 60. This is a winning combination of model and engine. I don't know about the pilot, however! Photo Borthwick.

gnomes in the Black Forest or molded in Lower Slobovia. It is the revs that do the damage. How many of you have been hit by a slow turning Texaco prop? I rest my case.

As you read this in four months or so, deadlines being what they are, I will be having my fourth consecutive summer in the northern hemisphere. I leave (left) for the US of A on June 10th, and will not be coming 'home' until the third week in October. All of this makes getting some words of wisdom to you that are not terribly incorrect or out of date, extremely difficult. As I have said before, it is a tough job, but somebody has to do it.

I expect to hear some Aussie voices at the SAM NA Champs to be held at Jean NV again this year, including "Our man in Canberra", Allan Laycock. Allan has got a 'leave pass' and is currently planning his itinerary. The other voices that I hope to hear, depending on health considerations, are those of Gordon and Jose Burford, who are just great company. Why don't some of you other guys and gals try to make it over. The recession we are going through right now will be a little better across the Pacific, or it will sure appear to be that way.

I have succumbed to a certain amount of pressure, and will be taking in, among other delights, Oshkosh, Reno, the AMA FF Nats, the Fort Worth OT bash, lots of sightseeing and visiting and, of course, the SAM NA Champs as the climax. I am certainly looking forward to seeing a whole lot of great people and a great deal more of a great country.

$ $ $ $ $ $ $ $ $ $ $ $ $

I was fascinated to see somebody in this great land of ours offering for sale an O & R 60 for $A325. I must see if I can get a couple of sugar bags full of them. Sounds like instant wealth to me!

$ $ $ $ $ $ $ $ $ $ $ $ $

The members of SAM 84, the Vintagents, who achieved third place in the recent ½A Postal Contest. Left to right: Des Slattery, Barry Dent, Colin Borthwick, Anthony Williamson, Ken Ryder, Anthony French, Alan Mowat and Col Somers helping hold the banner. John French took the photo.

Any modellers, either flyers or engine collectors needing parts for Brown, Bunch, Ohlsson or Hurleman could do a lot worse than to write to Herb Wahl of Herb's Model Motors, Box 61 Rt. 87 Forksville, PA. 18616 USA. Ask for his catalogue and price list. I suggest you send him something to defray his expenses. He is a great guy and a source of some beautifully crafted reproduction engines and parts.

* * * * * * * * * * * * *

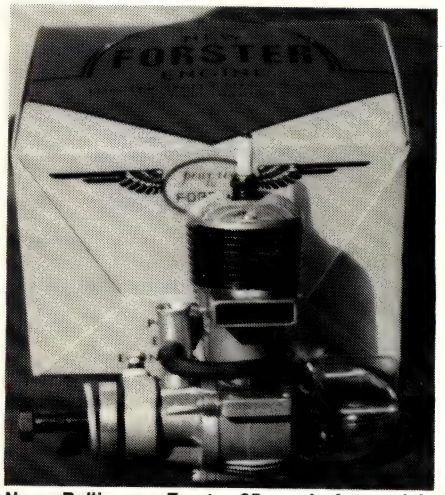
Think of this *one when* you start playing with that new "all singing and dancing" radio set you just smuggled into the house. (Own up; we all smuggle the good stuff in.) This I have chosen to call, though the reason now escapes me, Dent's Law.

"The perceived usefulness of an article is inversely proportional to its actual usefulness once bought and paid for".

* * * * * * * * * * * * *

Allow me to leave you with the First Law of Socio-Genetics on which to ponder until the next issue:

'Celibacy is definitely not hereditary'.



Norm Bell's new Forster 35, made from original components, dressed & checked before assembly. Norm is willing to provide the source; the 29 is also available, from the USA. Norm may be reached on (03) 857 9933.

P.A.R.C.S. OLD TIMER FUN FLY

from Stan Walsh

The weather on Sunday 3rd March was perfect: blue sky, just the right amount of breeze and warm to hot! Nine flyers fronted, naturally not all arriving at the right time. Two classes were flown: Duratiion and Texaco. Because of a late start and the day being a fun day, only one round of each was flown. Duration was flown on a full engine run, and we had 8 entries. Texaco was flown on a 20 cc fuel allowance, and we had 6 entries.

Duration

1. P. Donovan	Westerner	709
2. D. Cameron	Playboy	689
3. F. Chigwidgen	Record Hound	348

Texaco

1. A. Kennedy	Miss America	830
2. W. Bromby	Super Quaker	481
3. P. Hosking	Record Breaker	452

Outright - Duration & Texaco

1. Peter Donovan	361 + 709 = 1070
2. Don Cameron	689 + 379 = 1068
3. Andrew Kennedy	192 + 830 = 1022

To be a Modeller

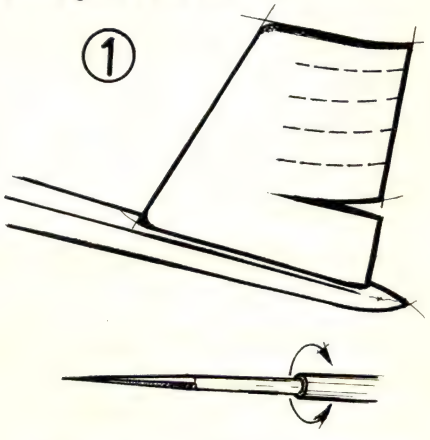
HINGES

Diagrams by Jaime Herder

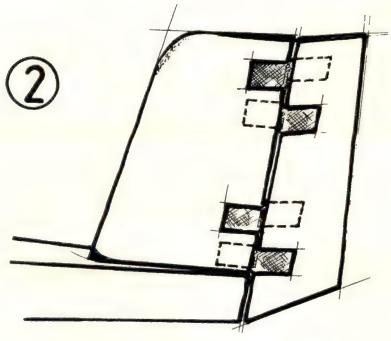
Control of an aircraft depends completely upon being able to adjust the set of the flying surfaces in flight. This is called altering the trim of the aircraft. Actual control of the attitude, that is, banking, turning and diving, uses the same means as trimming, but to a greater degree. The means of trim and control is by changing the angles of sections of the flying surfaces: the rudder on the fin; elevators on the tailplane; and ailerons, flaps, spoilers and slats on the wings. These control surfaces can be moved with levers or cables because they are articulated, or hinged onto the main, fixed surface.

There are many sorts of hinges.

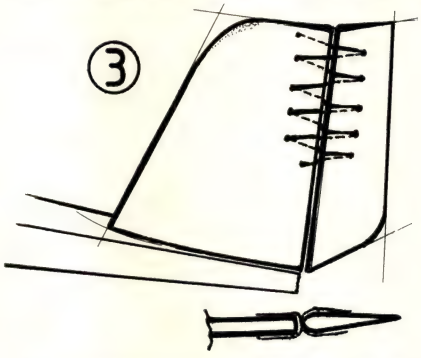
1. The soft wire for free flight trim tabs. Thin copper wire is pushed into fine holes made in the fin TE with a pin or a special drill. When the trim tab is bent to one side the angle of deflection is retained by the copper wire. Thin aluminium inserts may be used in the same way. The special drill is a triangulated pin cyano-ed into a fine tube. Twirling between forefinger and thumb gives a fine hole.



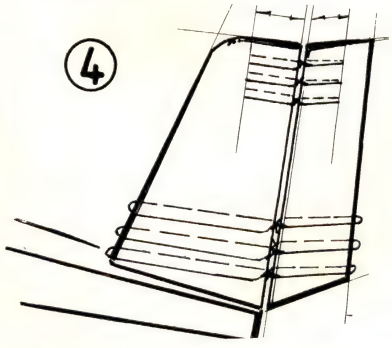
2. When the control surface is completely cut away, re-attachment may be done with strips of fabric such as cotton or nylon glued onto opposite faces of, for example, the fin and the rudder. Each hinge piece passes through the very fine gap between them. Glue should not be allowed on this part of the hinge so that the fabric retains its flexibility.



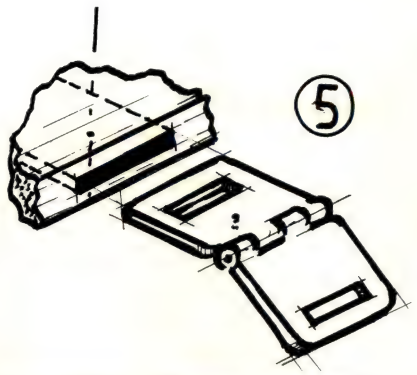
3. The simplest and lightest hinge is to sew the fin and rudder together using linen thread, or sewing cotton for small, light models. The technique is to push the needle through the wood of the fin, through the gap between the surfaces, then through the wood of the rudder, in the opposite direction, making a series of long, narrow figure 8s when viewed from above, gradually working down the hinge line. The thread is glued or doped after the hinge is completed, but adhesive should be prevented from reaching the thread between the surfaces.



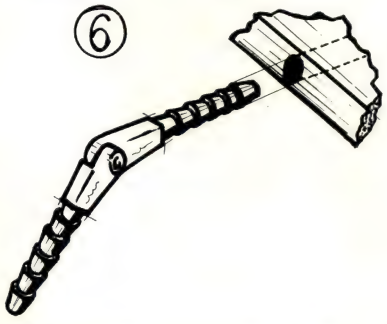
4. A variation on the thread hinge, which results in a zig-zag line of thread, is the Burford Hinge. In this case the thread is wrapped around the surfaces, passed between them as before, glued in place along the hinge line (not in the gap), then trimmed off, leaving a neat thread hinge with equal disposition on each surface. The name comes from Gordon Burford's use of this hinge in a model design more than 40 years ago.



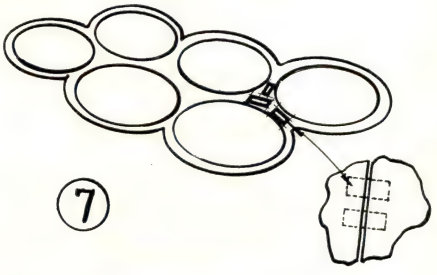
5. The standard type of hinge for RC models is the Klett hinge with two interlocking plastic leaves and a wire pin to hold them together. There are many versions, of different sizes, made by different companies, from ½A to giant scale. Installation is simple, but has to be done accurately; that is, carefully, so that the axis of each hinge lies on the same line, the hinge line. A special hinge slotting knife blade is available to make the task fairly easy. The hinges are usually glued in place (no glue on the wire, please) and then secured with a pin through the wood and plastic.



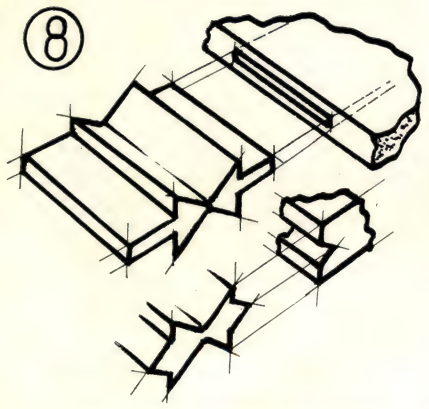
6. A variation on the plastic hinge, which is a flat leaf, is the Robart Hinge Point, which is basically a rod that has retaining flanges molded around it. Installation requires drilling a suitably sized hole and gluing in place. Removing these hinges is very difficult, and the two plastic parts may be separated somewhat like a ball and socket joint. Alignment of these hinges has to be done very carefully.



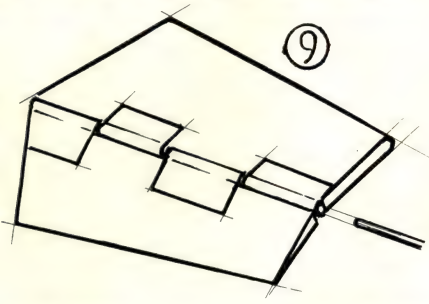
7. Plastic hinges without a wire pin have also gained some acceptance. They are easy to install since only a knife slit is required in the surfaces, and they are usually retained by a drop of cyano, and a pin snipped off flush with the wood as for the Klett hinge. These simple hinges are sometimes called *live hinges* (Does anyone know why?), and they are inexpensive if cut from the plastic holder of a six-pack. They have a fair amount of resistance to flexing, and may impose too high a hinge load for mini servos.



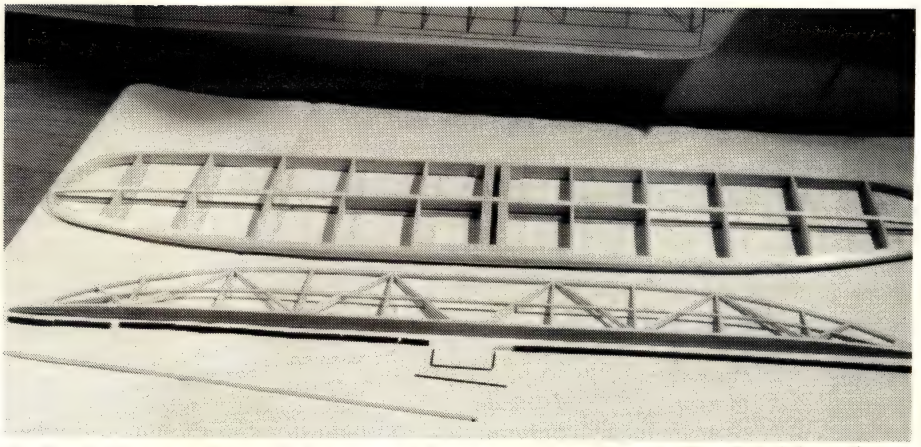
8. There are proprietary hinges other than Nos. 5, 6 & 7. One is the Formost Continuous Hinge that requires a groove to be cut in the edges of the main and control surfaces. The hinge is then cut to the required length and fixed with cyanoacrylate. It is very flexible and seals the gap, which are both good points, but although it comes in two sizes, it is very heavy. Short lengths may be used to reduce weight, but the strength of the connection is then reduced.



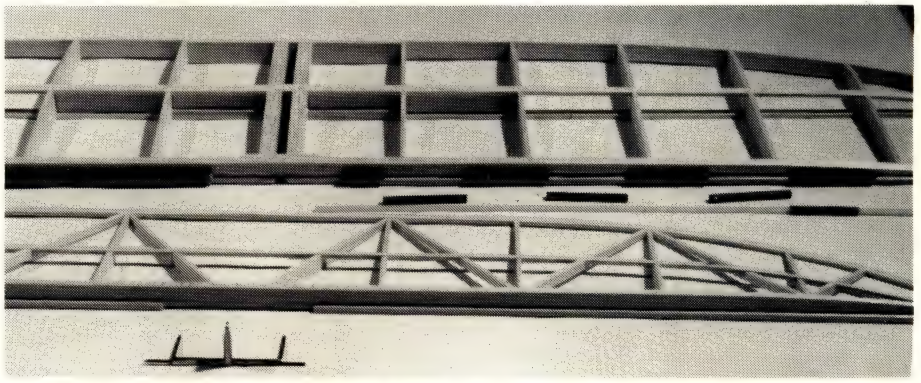
J. The best hinge is the piano hinge style. A high 'uality piano hinge is available for models, but it is meant for high quality scale models, and is ery expensive. An alternative composed of luminium tubing with a removable piano wire n has been used in modelling for many years, ut it has not become popular because it is ifficult to bond the metal hinge tube to the ooden airframe, and its security is a little ncertain. The Editor and I realised about a year go that the same type of hinge could be made ut of plastic nyrod, using the outer as the hinge ube and the inner as the hinge pin. It is lighter han metal, larger and more secure (better adhesion), and seals the gap very well. It is a t fiddly to assemble, but far easier than the wire nd al tubing hinge. It is moderately expensive, ut alternative, cheaper materials could be ound. We call it the Master Hinge. Time now o go over to pictures to explain the system.



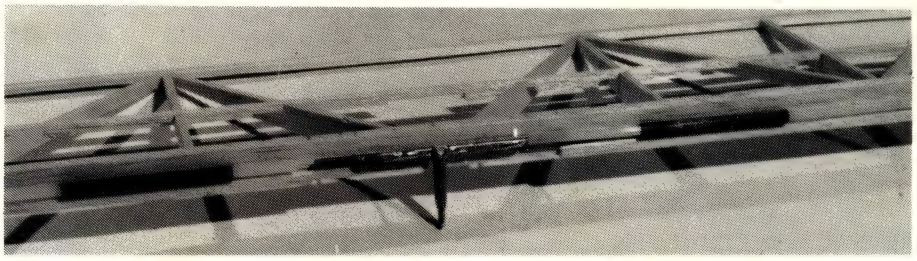
The Master hinge provides all the points required of a good hinge. As with all good echniques, it requires a little more effort, however, it overcomes the air gap between main urface and control surface, a major contributor



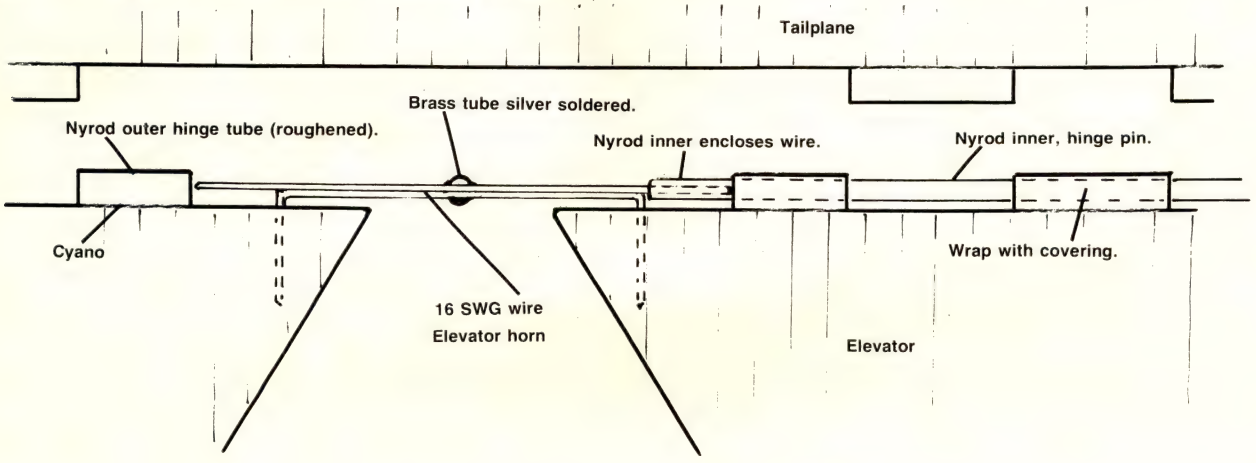
Old Timer tailplane and elevator to be hinged. Nyrod outer is roughened with wet and dry and cut into short lengths about 15 to 35 mm long. Elevator horn is made of 2 pieces of 16 SWG wire and brass tube. On left is nyrod inner and pieces of outer, in line. On right the pieces are assembled on the nyrod inner.

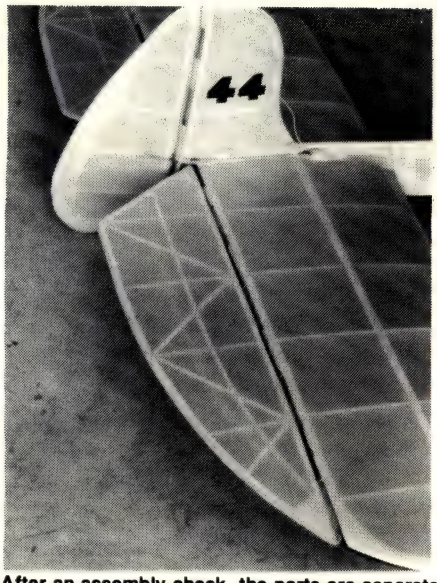


Alternative hinge pieces are cyano-ed to the elevator spar which is grooved to about 1.5 mm. Nyrod inner used to align pieces. The other hinge pieces are cyano-ed to the elevator LE, again using the inner for alignment. Be sparing with the cyano. Elevator horn is soldered together.



With outer hinge pieces glued alternatively to tailplane and elevator, and with a close mesh, the hinge is completed by sliding the inner through them. The root end of the hinge inner slips over the ends of the wire of the elevator horn, right, locking the assembly together and giving support where elevator loads are applied.

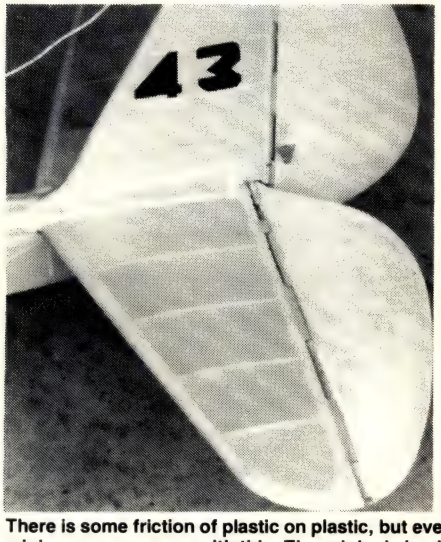




After an assembly check, the parts are separated and covering is applied to tailplane and elevator. The covering wraps around the hinge outer pieces, from top and bottom, securing them to the airframe. Covering material is trimmed away between the pieces so that they mesh properly for re-assembly.

to poor control of RC aircraft. *(Probably third behind pilot error and battery failure.)* It has been tested on several models for many months without a hint of any problem, and it should be strong enough to cope with the stresses on models of all sizes. The principle may be adapted for other-sized materials, too.

Whichever idea you use, from 1 to 9, don't come unhinged!



There is some friction of plastic on plastic, but even mini servos can cope with this. The original slop in the nyrod is taken up by the covering over wrap. The ends of the hinge outer pieces should be filed to prevent jamming. A tight hinge will creak during movement. The hinge inner can be removed, releasing the control surface for maintenance.

SIGN-OFF

I have been called to another big job so will be unable to continue this series for the time being. The recess could be a temporary one if there are enough reader requests for more model engineer style modelling. The survey made a couple of years ago indicated clearly the need for a discussion of some basic ideas, and it is time now for the readers to indicate what topics they would like to have discussed. Pile the letters on the Editor's desk till I can call in to collect them!

A QUESTION

Chris Liesfield of Mt. Clear in Victoria has contributed an interesting letter that is given in the editorial pages. The following is in response to his question about propellers.

With respect to the query about using large props on small engines, there is no reason not to do so. For many years the Editor used a 10 x 6 on a 2.5 cc diesel in a KK Southerner. The big prop made it easy to start, gave good fuel economy and provided enough power for the model. Any engine can be run at any speed provided that the controls are properly adjusted. Usually large props and slow rpm are kinder to an engine than the opposite. Would you drive the family car around in first gear all the time?

The key point is to use the engine and prop (fuel and glo plug) that are best matched to the model. I use 11 x 4s on my 40s because they are in Old Timer type models: big, light and slow flying. The 11 cm diameter gives a good sized prop disc for efficiency, and the low pitch allows the engines to rev out near best rpm.

If you want all the power that an engine can give then you would use an 8 x 6 on a 40 (assuming ABC, Schnuerle type), which is pretty ridiculous, but is, in fact, close to the size used in pylon racing. Remember that the power output curve of an engine has a fairly flat hump, and that using an rpm figure on the slow side of the hump is the normal, sensible way to run an engine. Doing this enables the engine to gain rpm in a dive without over-revving, and to still produce plenty of power when climbing as the rpm drops. Over-revving is bad: have you ever seen an engine lose its prop and do a shaft run?! Provided that the rpm drop in a climb is not too great, the engine will be quite OK.

Thus you choose a prop that you think will suit the model, allowing for its size and weight (wing loading), and see how it works. If it over-revs in a dive, go to more pitch; if it sags in the climb, go to less pitch and more diameter to compensate. For 6.5 cc (40 size) engines it has been found that the 10 x 6 is about right, but now it is recommended that props should be larger (Bolly 10.5 x 7) to give lower rpm and less noise. They work better too. A 12 x 6 on a 40 would not be bad, but it would be well down on rpm, and thus power. If the needle valve is properly adjusted it would not hurt the engine at all.

With small engines the loss of rpm and power on large props may reduce performance too far. On the other hand, free flight scale and scramble flyers use large props, get low rpm and run the engines rich. This gives an almost no-climb power pattern, one-flick starts and very enjoyable flying. Even the small glo motors that normally use 6 x 3 props (Cox 049s) will run well on 7 x 4 and 8 x 4 sizes, which is the size for ½A Texaco.

In any case, mount the engine properly (try a soft mount), bolt the prop on tightly and adjust the needle valve carefully. Take it up to top rpm then back off a ¼ turn rich. From 2,000 to 20,000 rpm the engine will be OK, assuming that it has good (approx 20% oil), clean fuel.

Electric Flight

By Phil STEVENSON

Third place at SSL electric day, Mal Pring with Super Lucifer, a 2.2 metre glider with internally braced wing and tail. Kyosho 36PT Graupner 8 x 4½ folder, 7 x 800 AR cells, HITEC switch BEC and brake. Howie Photo.

Second place at SSL electric day. Richard Tapp with 7-cell Electricus. He won the last Nats with this model. Photo from Don Howie.

E.F. NEWSLETTER

If you find my writings insufficient, you can top up on electric news via Peter Pine's Electric Flight Newsletter, published several times a year from Moore Park Hobbies (see ad this issue). Despite its source, this newsletter is far more than just an advertising medium, containing many items with local and overseas developments and ideas. Recent issues have covered the World Champs and the National Electric Rally. There is always something new and worthwhile, so send your subs to Peter. In an unofficial and different way, this newsletter has taken over from the AEFS newsletter prepared by Ian Avery and myself on an irregular basis several years ago and since lapsed for various reasons.

NEW PRODUCTS

Graupner Range

Moore Park have gained an agency for the Graupner range to complement the established quality Multiplex, STW and Hectoplett ranges imported from Europe. There are several excellent electric model kits, as well as a good range of motors, varying from the simple Speed 600 (Mabuchi 540 derivative) to the Ultra 1000 Neodymium. The Graupner range of folding props will now be available in full, with replacement blades and collet adaptors for 1/8 inch, 4 mm and 5 mm motor shafts.

Another item never offered before is a new Direct Current clamp-on ammeter. This can be used to measure current in a cable without direct connection by measuring the induced field around the wire. In so doing there is no effect whatever on the circuit, and hence the measured value is the true figure, unlike other types of meters, placed in the circuit, which provide an added resistance and hence record a reduced current. This new meter can be used even on systems fully installed in a model.

New Controller

The STW range of proportional throttles, switches and chargers continues to increase. The latest offering is a purpose-designed Australian model, with 6 to 14 cell capacity, reducing the cost from the standard 32 cell models. The new model is a nominal 30 Amp unit with a 34 Amp (real current) limit. A new feature is a thermal cut-out, which turns the power off in the event of over-heating and/or prolonged current overload I inadvertently tested this feature when a motor magnet became dislodged and, although it continued to run the increased current load, soon initiated the overload circuit, preventing further damage. I remember two similar events in the past, both with cheaper brand units, and the result was, in both cases, a burnt out controller. The STW saves itself!

The new unit uses very efficient MOSFETS. My bench tests, with a 7 cell set-up, showed only a 0.37 Volt drop across the unit at 20 Amps. This is equivalent to the lowest loss of any controller I have tested. The only one to match is an old Mk2 50 Amp STW, but by comparison the new model is very small. The unit is 50 x 28 x 9 mm, and 32 gram, compared to the earlier 50 which was 50 x 40 x 17 mm and 53 gr. The reduction is due mostly to the surface mounting technology employed on all STW controllers and switches for about a year or more.

Like all STWs, it is fully opto-isolated, has current overload protection, no glitch switch on, 8 second dynamic brake and high frequency switching; all features able to convince more than half the World Champs competitors that the STW brand was the only one worth considering.

This model will cost a little less than $200, but is, as the ad says, 'The best little speed controller in the world''.

New Cells

I have been using a pack of 7 new 1400 SCR Sanyos in my pylon model. Mine came from David Ray's DR Batteries, but they are readily available at good electric suppliers. These cells are the same physical size as the traditional 1200 sub-Cs, but are a gram or so heavier. Compared with my old 1200 SCRs, I have noticed a marked improvement in several aspects.

Firstly the quoted capacity is genuine, possibly even conservative. I am getting up to 100 Amp-minutes from the pack, with full power right the way through to a sudden, distinct power drop-off. There is a noticeable increase in available power relative to my old cells due, no doubt, to a reduction in the internal resistance. This reduction is also observable in charging, as the pack peak voltage at 3 Amps charge rate is only about 11.2 Volts, compared with up to 12 Volts for some of my older SCR packs. The difference is a measure of the relative internal resistance, not the voltage available under load as is sometimes believed by the uninformed. The higher the peak voltage the more resistance and hence the poorer the pack performance.

Anyway, if you are in need of a new pack, give the 1400 SCRs a go. You won't be disappointed.

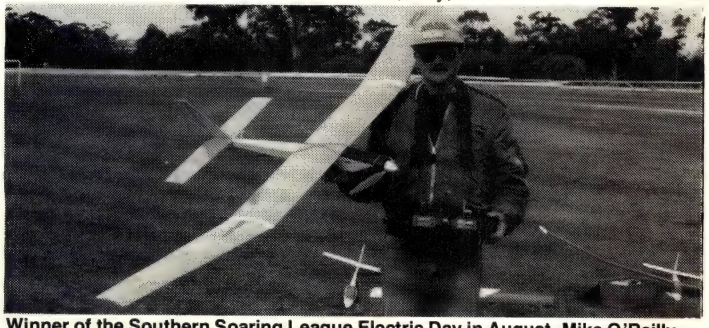
World Champs Contenders

Interest in the next Wold Champs is kindling. Of our previous F3E teams, only Mike Farren was keen to continue, and with his father, Roy, in support, is already planning ahead in WA. But since the National Rally, Peter Pine has encouraged both Ray Pike and David Hobby from Victoria to get interested. Both are very competent flyers and should do our country proud, but there is a lot of commitment involved in developing the equipment, planes and skills, as well as the not inconsiderable financial stake to be sacrificed before any team makes it to the starting line. Peter has offered considerable technical assistance, and may even make the trip himself if circumstances permit. Also, Roy Farren has initiated fund raising by publishing a series of small guides to various aspects of general electric flying. Roy promoted these to many club secretaries throughout the country, but if your club does not have a set, send $20 to Roy at: 34 Bartling Crescent, Bateman, WA, 6155. I wish these people the best with their efforts. It's nice to see some new blood; this event deserves even more.

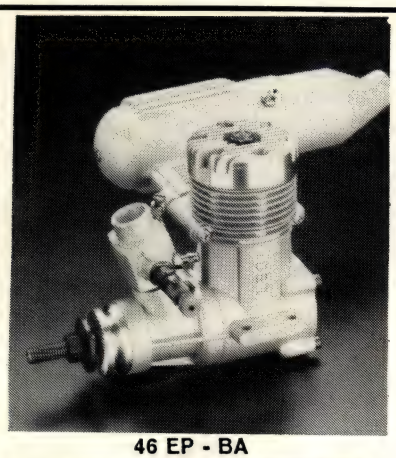
Dave Whitten with HKC Seagull 2.2 metre ARF at the SSL electric day. HKC motor and thinned 8 x 4 prop. Another Howie photo.

1991 DIGEST

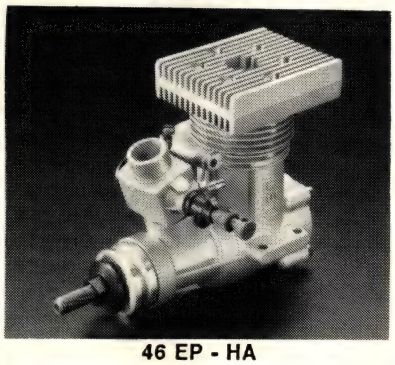
Our editor, not content with just putting this journal together, has again colledted the efforts of many of the country's prolific modellers onto Joan's typesetter and turned out a worthy follow-up to the successful 1990 Aeromodelling Digest. Again there are items on all subjects, and I, for one, enjoyed reading about a few subjects not normally in my field of interest. My contribution this time is a list of successful model, motor, cell, switch combinations, together with a summary of available chargers. There are also a couple of pages on general electric model safety and hints. So, if you got this far through this column, you will probably get your $16 worth from that one article alone. Then you can read about all the other models, aerodynamics, meteorology and so on for nothing! See the ad in this issue, and send your $16 to RMB 1798, Benalla, 3673.



Winner of the Southern Soaring League Electric Day in August, Mike O'Reilly and combo model. Eclipse with Electra wing. Astro 05 FAI geared to 13 x 7 Bolly prop, 7 x 600 SCR cells gave 60 second motor run. Wing and tail covered with Fibafilm. Howie pic.



46 EP - BA



46 EP - HA

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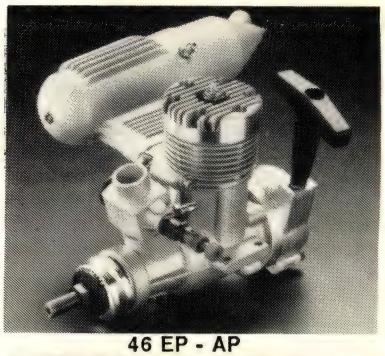

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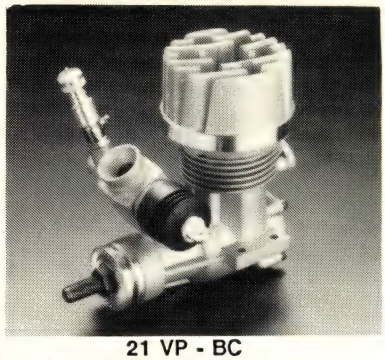

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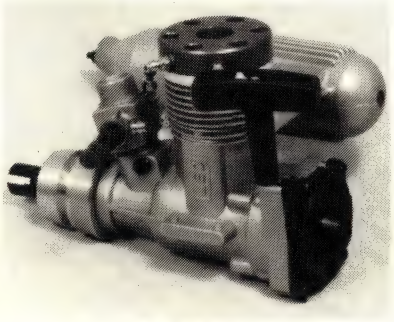

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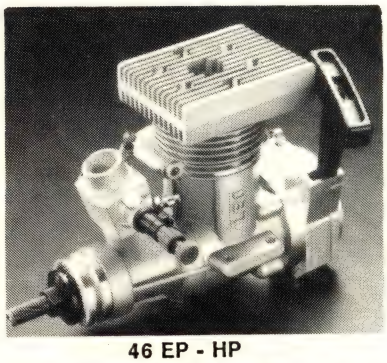

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Control Lines

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ALL IN THE FAMILY?

In Control Lines last issue, on page 66, the pilot on the right is Louis Peilschmidt, jousting with Randall and Fitzgerald. Excuse please, Leon. Must be the effect of the heat!

CONTROL LINE COMPETITION GUIDE

This article is in response to a letter , and written so that readers can understand and better appreciate the performances described in competition reports. I also hope the article will act as a useful aid to novices who want to try competition events but find themselves lost when it comes to choosing an appropriate class to their budget and experience. The all-singing, all-dancing version of this article would rival the length of 'War and Peace', so this quick referrence version is not claimed to cover every aspect of every competition class.

EVENTS — WHO RUNS C.L. COMPETITONS?

Clubs

Informal fun type events. Low key. Unofficial rules to suit the occasion. Suits typical kit and profile sports models. So-called, expensive, racing engines normally disallowed. Good for improving skills and learning how to fly 2 and 3 in one circle. Sometimes restricted to members of that particular club only.

Interclub competitions

Sanctioned by the State Association. Run in a flexible way to State approved rules. Include various slowed-down and novice classes. Any financial member of any MAAA club may enter. At this level both organisers and expert flyers try to make allowances for mistakes due to inexperience or not knowing all the procedures. You will be expected to turn up to the comp on time and have read the rules. Ideal level for testing new models, sorting out your act, asking questions and getting to know what you must do to improve.

State Champs

NSW, SA and Vic run a 2 or 3 day event. WA, and I think Qld, split their State Champs up and run them through the year.

Classes to be flown are selected from official State, Australian and International FAI classes; i.e. popular in that state, supported by competitors coming from interstate, or FAI classes. The FAI events at State Champs are also Team Trials used to select an Australian Team for Trans Tasman and World Champs.

3 entries needed for FAI classes, and typically 3 to 5 entries for other classes to have official event status.

Any financial member of an MAAA club or visitor from overseas may enter. You will be expected to be ready to enter the circle when called, have tested the models, to fly or pit per the rules, have equipment that meets state safety specs and to be basically competent. At this level you can make the top 3 with a good act and out of the box engine - even a good used one. Take part. Aim to put in consistent flights in all weather conditions and improve your previous best.

Nationals

Australian Nats are run over about a 7 day period. The venue rotates between the different states. Normally held during the New Year holiday period, but SA will hold the next Nats in April 1992.

Classes selected from those in the MAAA Rules Book.

Classes must attract a minium of 5 entries to be run officially.

Flying in FAI classes earns points towards Australian team selection. Visiting overseas modellers as well as MAAA members are eligible to enter. Standards are higher, as one would expect, but making the final is by no means beyond the reach of any determined modeller prepared to carefully prepare their equipment and put in the practice.

Trans Tasman Team and Open Events

Run on the years when there is no CL World Champs every second year. Venue alternates between New Zealand and Australia.

Team Event - Not an international event per FAI Sporting Code, but as it is a competition between two national teams (NZ and Aust) it is international in a de-facto way. For FAI classes only.

Open Event - Normally run after the teams event. For FAI classes.

To take part in the team event you have to earn your place on the team, just as and Olympic athlete does. To take part in the open contest you just need to be a financial member with an FAI model and know what you are doing. It takes some real effort to qualify for the teams but most people with the motivation can do it. Lack of talent can still be overcome by more effort at this level. Good but not spectacular engines and models are needed.

Brian Randall preparing Mark Ellins' Open Combat models for battle. Mark came 4th at the Bendigo Nats. Models use Enya CX 40s. G. Wilson photo.

World Champs

Venue changes form country to country, but typically in Europe.

Eligibility: winner of previous World Champs, and each country may be represented by a 3 person team in each FAI class. In Australia the same selection process is used as for the Trans Tasman.

Only FAI classes are flown. The contest runs for about 5 days.

Strict procedures are followed to give equal practice time for each country (official practice) and competitors' flights and races are scheduled precisely. Very slick and professional compared to here.

Competition among the experts in the field. Won by people who are truly master craftsmen; many build their own engines to aerospace finish standards. All are motivated to reach the necessary standard regardless of the cost, effort and time involved. The quest to be World Champion becomes a way of life.

RULES

The MAAA produces an official rules book that may be purchased from your state association. This rules book contains rules for the FAI events as well as the MAAA or Australian events, and every person involved in competition should own a current copy. Cost about $15.

Robin Hiern's Ambassador Vintage Stunt model. Motor is a Taipan 2.5 cc diesel (Red Head) or AM 25 (2.5 cc) diesel. Beautifully proportioned aircraft. R. Hiern photo.

PREFIXES

Open . . Typically 6.6cc (.40 engine). Also term used to describe unlimited fuel Speed classes.

½A . . . . Smaller version of the FAI class. .8cc to 2cc. Allowed size varies with event. Check rules.

Class 1 . 2.5 cc max size engine in Australia.

Class 2 . 5 cc max size engine in Australia.

Class 3 . 10 cc max size engine in Australia.

Class 4 . 5.01 to 6.6 cc max size engine in Aust.

Rat . . . . Racing with few restrictions on flying style or model.

Junior . At least one team member must be younger than or 18 years old.

Vintage For models designed before 1957 or 1960 (stunt).

Slow . . . Restricted (sport) engines to tame performance.

Simple . Cheap 2.5 cc sport engines typical. Low tech models.

Profile . Must be built with a solid sheet fuselage.

FAI . . . . Highly developed high tech international event.
F2(A), (B), (C), (D) = FAI speed, stunt, racing, combat.
F4B = Control Line Scale. (FAI suits skilled modellers).

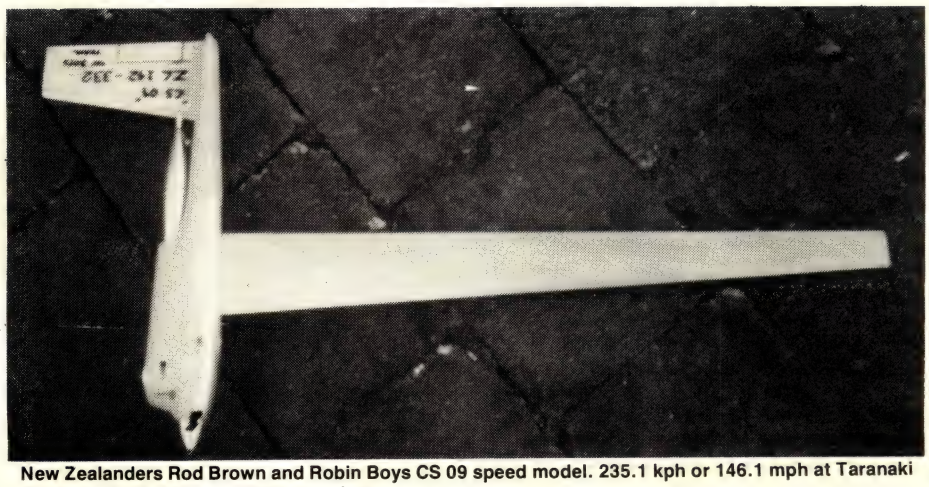
MAKING SENSE OF THE SCORING

Racing - 1.9 cc (Vic and SA), 2.5 cc and Simple Rat races and Basic Racing (SA), have a time limit for heats and finals. The aim of teams is to fly as many laps as they can in that time. In case anyone would like to build one. Based on McDonalds Stilletto, my model was powered by a Merco 35 and used a Palmer stunt tank. I suggest you experiment yourself with props and fuels as they vary so much and you might find it better to work out what is best for you. My model weighed about 50 ozs and the Merco was swinging a 10 × 5 Top Flite wooden prop on 10% nitromethane. This combo seemed to work in Britain and Europe without any major changes. Hope you find a use for all this. Keep up the good work.

Regards J.W. Tidey.

1992 SOUTH AUSTRALIAN NATIONALS

I have been asked by CL flyers to publish what will be the situation as regards noise at the Nats, and how this will affect control line events. This text is the decision as reported in the official minutes of the SAAA Management Committee Meeting, SAAA Newsletter. "Any grass surface events which could cause a noise problem in town to be transferred to the airport." "All categories are to be flown to the specific noise limits stated in the current Rule Book for that event." In short, no sound level testing this time.



New Zealanders Rod Brown and Robin Boys CS 09 speed model. 235.1 kph or 146.1 mph at Taranaki Champs, April 1991. A. Robinson photo.

The **Program** for CL events will be:

Wed. 22 April	Registration, Processing, Practice Flying, Briefing.
Thurs. 23 April	F2A Speed, Combined Speed, F2B Stunt (Rnd 1 & 2)
Fri. 24 April	Vintage Team Race, Vintage Stunt, ½A Team Race
Sat. 25 April	F2C Team Race, 2.5 cc Rat Race, F2B Stunt (Rnd 3 & 4)
Sun. 26 April	F2D Combat, Jnr F2D Combat
Mon. 27 April	Goodyear, Mini Goodyear
Tues. 28 April	Jnr Rat Race, Class 2 Team Race, Open Rat, Open Combat Scale

FAST KIWIS

In 09 Speed in the UK, many have tried, but given up trying, to beat a chap by the name of Joe Myska. Joe has monopolised the 09 class to the point where he has run out of serious competition. His UK 09 Speed record is 225.28 kph. At the Taranaki Champs (New Zealand) in April this year, Brown-Boys improved on this by almost 10 kph - a **big** margin in speed events, and the Brown-Boys model may be the fastest 09 model in the world.

Open Rat, all team racing classes, Scale Racing and Goodyear classes the race is over a set distance and the aim is to complete that distance in the shortest time. To make it more exciting, either a set minimum number of pit stops have to be made during a race (this tends to favour the raw horsepower approach), or fuel tank capacity is restricted (this requires balancing horsepower against fuel consumption and tends to favour diesel engines). Team and Goodyear races have 100 lap heats and a 200 lap final and Open Rat has 70 lap heats and 140 lap final. This equates to 5 mile and 10 mile races for Mini Goodyear and Open Rat, and 10 km and 20 km races for Scale Racing (Goodyear) and FAI Team Race.

Scale - In CL scale, static judgng is now done by subjective impression not by placing ruler on the model. In Stand-Off Scale (Vic) the judging distance in increased making it less necessary to do fiddly and time consuming detailing. Points are deducted from a maximum possible for

The Elias family. Adam standing and John kneeling. Keen aerobatics flyers both. Model is a Dolphin. R. Burrell photo.

errors judges find by comparing the model to photos and scale drawings of the full size aircraft. Competitors supply this documentation, and inadequate documentation can result in a nice model receiving low points. Competitors are either required (F4B) or allowed (Stand-off) to make 2 flights. Points are awarded for completing compulsory manoeuvres and bonus points are earned by performing optional manoeuvres.

Combat - In Combat points are awarded for each cut made on an opponent's streamer. Most combat classes also award points for air time or eliminate pilots for landing during the 4 minutes combat period. The aim is to prevent a pilot who is ahead on cuts from landing prematurely and winning a bout by denying the opponent the chance to gain cuts. Points are deducted for stepping outside a 1.5 metre radius pilots' circle (stops the defending pilot evading attack by running away) and various actions deemed unfair or unsafe. In Profile WW2 Combat (SA) a 1 metre no-cut zone applies to the streamer string from model to 1 metre back. Making a cut in this area is treated the same as having caused a mid-air collision and eliminates the attacking pilot from the contest. Usually a double elimination system applies (ie. when you loose 2 bouts you are eliminated), but straight out single elimination or a first round repercharge system are sometimes used in club and state events (needs less models and takes less time to get a result).

Aerobatics - or Stunt flights are judged by a panel of judges who compare the height, crossover points, size and shapes of the relevant manoeuvre to an ideal as drawn and described in the rules book. Number of rounds or flights varies depending on the number of entries, the class and available time, but normally at least 2 rounds are flown. In FAI Stunt the manoeuvres are given a difficulty or K factor. The score given by the judge is multiplied by the K factor and this gives added importance to doing the hard manoeuvres like the square figure 8, 4 leaf clover and hourglass well. In FAI Stunt and Novice Stunt (SA) flights must be completed within a maximum time period or you score 0 landing points. Novice Stunt classes exist in at least SA and Vic, which do not require the hardest manoeuvres to be flown or the full FAI pattern is used but only novices may enter. Vintage stunt has a very easy pattern and static scoring which gives bonus points for older engines and designs, biplanes, no moving flaps and authentic construction. Quality of authenticating documentation can affect points.

Speed - All speed events are timed over a set number of laps. It is a very fair and pure form of competition, with virtually no subjective judging element, or other teams or pilots to blame for bombing out. The stop watch does not lie. Timing begins on the pilot's signal or when the handle is placed in the pylon. The number of laps that have to be flown are:

6 laps on 10.66 metre lines in 'Midge' (SA, NSW & Vic);, < 1 cc (Vic) = ¼ mile;
6 laps on 21.35 m lines in Class 3 = ½ mile;
7 laps on 18.3 m lines in Class 1 & Class 4 = about ½ mile;
10 laps on 15.93 m lines in FAI = 1 km;
10 laps on 10.66 m lines in < 1 cc (SA);
12 laps on 13.27 m lines < 2 cc (SA & Vic) = 1 km, and
14 laps on 18.3 m lines in Pronto - approx ½ mile

Two or more timers time all flights. Any timing more than 1/10 second different (2/10ths for FAI) is disregarded and the rest averaged out. When there are enough entries in one class the winner is simply the fastest on the day. When there are insufficient entries in each class, all classes are flown together as Combined Speed. To score a combined event each model's best time is converted to a percentage of the current class record. Higher percentage means higher placing. FAI & Combined Speed are scored the best of 3 official flights. NSW Midge allows only 2 official flights. All flights in FAI Speed and MAAA speed classes must be made using a pylon to prevent whipping. NSW does not require a pylon to be used in Midge. SA rules allow novices to fly Midge, < 1 cc and ⅓ 2 cc without a pylon but only times done using a pylon are recognised for record claims.

(to be continued)

W.A. STATE CHAMPS NEWS

from C. Stone

The State events of Goodyear Scale Racing and FAI Team Race were held as planned on June 9th. Lots of onlookers turned up to watch. They included some temporarily retired racers, Pete Somers and Dave Moignard, both of whom were reading the Vintage Team Race rules. Five teams flew in Goodyear and both the fastest heat time (4:21.27) and final (9:49.21) went to Haynes-Fry of Mercurians Club. Mills-Bellis took second and Farstone-Skipworth could not compete in the final due to damage incured during the heats. There were 3 entries in FAI Team Race. The fastest heat time (4:40.93) was set by Adler-Stivey, who also won convincingly in the final with a time of 9:31.07. Mills was using his homebuilt engine with front exhaust and steel front housing.

Wanted to Buy: Good E.D. 2.46 Racer to use in Vintage Team Race. Contact Charlie Stone, 9 Hemeleers Street, Gosnells, WA, 6110.

CAN ANYONE HELP PLEASE

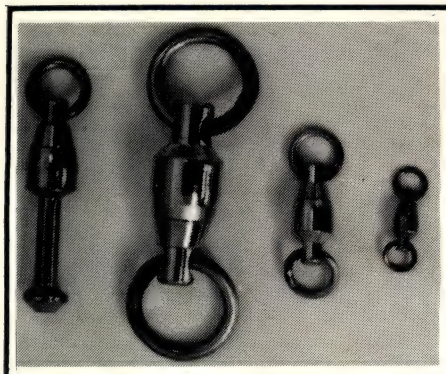
I enjoy receiving your contributions and I would like to share a letter I received from John Tidey. Someone out there must have a Class 3 Team Racer plan.

Dear Ivars,

First of all, allow me to congratualte you guys on keeping the control line movement going, especially in Airborne. It's great to hear that some of my old Victorian buddies are sill flying, regards particularly to John Hallowell and Tony Lever. Good to know that they are doing so well in Vintage Team Race. I well remember the days of Albert Park team races and the Nationals we attended. John H. and I had a great team going and had great rapport with Tony Farnan, Athol Holtham, Graham Rice, Monty, of course, and not forgetting Ken Taylor. Tony Lever was more into free flight in those days, but I guess, like me, it's getting harder chasing those models across open paddocks.

Speaking of those early days, I have a request from my brother-in-law in the U.K. (who also flys models) for a plan, any plan, of a Class 3 Team Racer. I have the rules, but he would like a copy of the legitimate machine. Can anyone out there help? [Contact John Tidey, 31 Graham Street, Glendale, NSW, 2285, please].

TRADE NOTES



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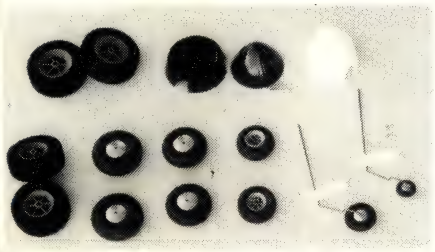
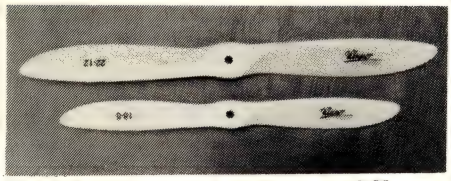
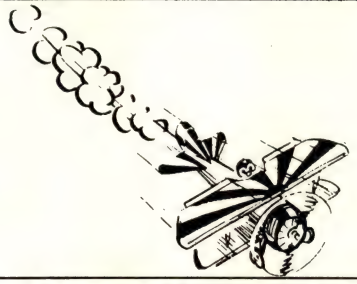


Dawn Trading now have available new accessories. Foam wheels, at 60 mm and 54mm and weighing about 25 grams per pair, are from Aristo Craft. Molded Wheels with metal hubs are 50 mm and 44 mm diameter, weigh 43 grams and 38 grams per pair. 38 mm wheels with plastic hubs have grooved tyres, 17 grams per pair. Tail wheels are 32 and 20 mm diameter; 13 grams and 7 grams. Four different mounting methods are shown. Top right are spinner for 3-bladed props, 68 and 65 mm diameter. All are from Radio Active in England.



From Austria comes the range of Marco wooden propellors. Featuring a CLARK Y section for optimum performance and easy low revolution starting not to mention very little prop. noise. The Marco range of propellors is to be released at a very reasonable price for top quality propellors. Sizes range from 9 x 4 to 24 x 14 and will be available soon from HD Model Design, 18 Bleby Court, Para Hills West, S.A. 5096. PH: (08) 260 2323.



N.S.W. HELICOPTER TITLES

The 7th and 8th of September saw the 1991 New South Wales Helicopter Titles.

Flown in near perfect conditions, a contingency of 18 pilots from around the country battled in the three classes, F3C, Intermediate and Novice.

In one of the closest F3C competitions for many years, the newly released Concept 60's flown by Robert Barbuto and John Wessel managed to take first and second place respectivly. Third place was taken by a relative new comer, Ian MacDonald flying an X-Cell 60.

Final results are as follows:

F3C

1. Robert Barbuto (Vic) Concept 60 (Score: 600). 2. John Wessel (Vic) Concept 60 (580) 3. Ian MacDonald (NSW) X-Cell 60 (571). 4. Simon Ventevagel (Vic) Kalt Alpha (563.5). 5. Fred Proos (Qld) X-Cell 60 (512). 6. Peter Riekst (Qld) X-Cell 60 (503). 7. Julian Clutterbuck (NSW) X-Cell 60 (307.5). 8. Paul Dewar (Vic) Uario Starlite (94.5).

INTERMEDIATE

1. Scott Lennon (Vic) Schluter Champion. 2. Mike Farnham (Vic) Kalt Alpha. 3. Bob Newcombe (Qld) X-Cell 60. 4. Alan Cook (Qld) X-Cell 60.

NOVICE

1. Peter Vambaris (NSW) X-Cell 60. 2. Jeff Brown (NSW) X-Cell 60. 3. Bruce Newcombe (Qld) X-Cell 60. 4. Bruce Smith (Vic) X-Cell 60 5. George Benedec (NSW) Schluter Majic 6. Keith Young (NSW) Kalt Space Baron.

Rob Barbuto and John Wessel with - their Kyosho Concept 60's.

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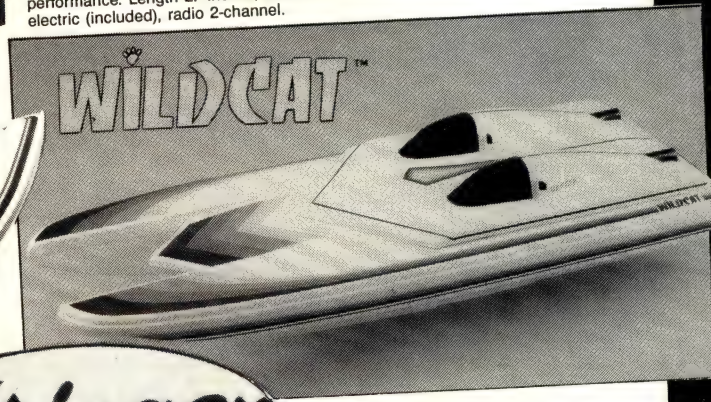

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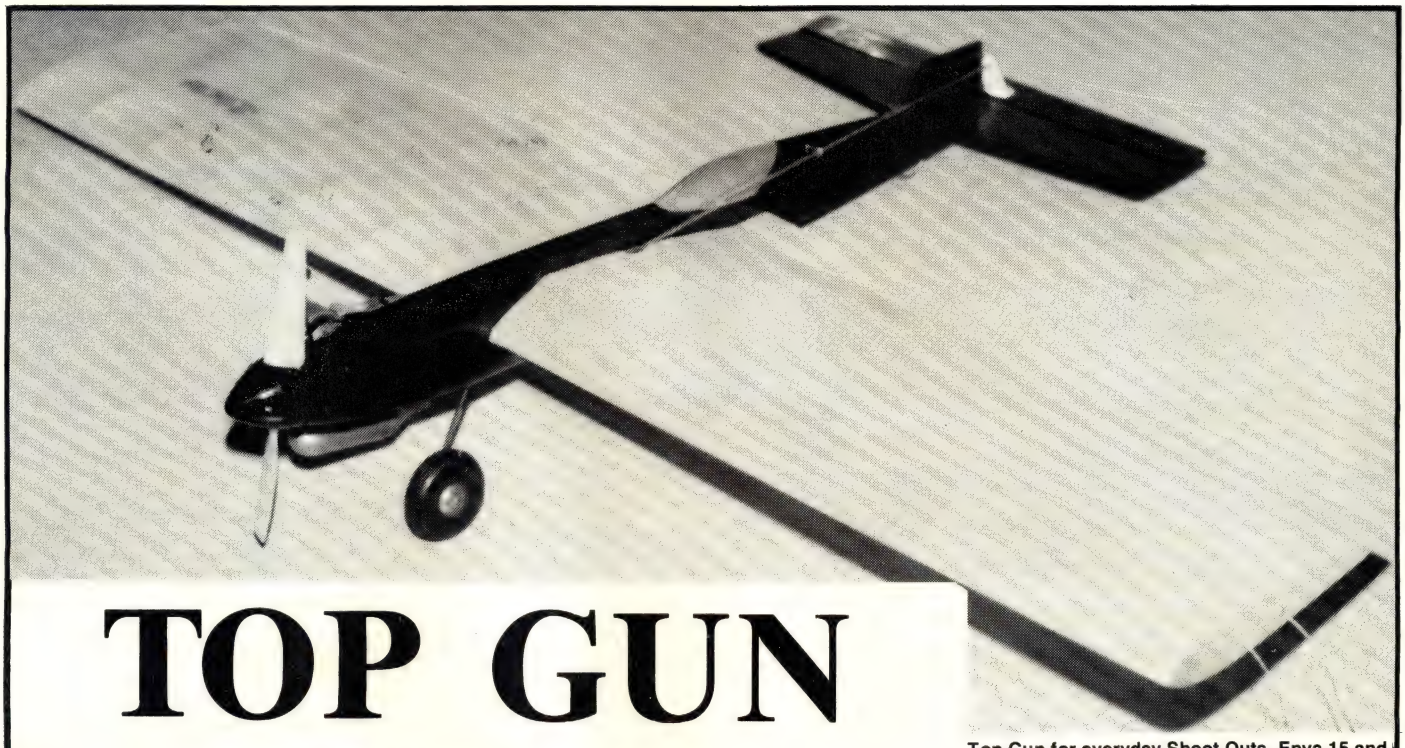


TOP GUN

Designed and Drawn using ModelCad

Top Gun for everyday Shoot Outs. Enya 15 and 8 x 4 Taipan prop. Pushrod on top of elevator on this version. Photos from the designer.

by Ivars Dislers

One of the great aspects of Control Line is the amount of fun one can have with a multi purpose model such as Top Gun. The prototype was conceived as a design suitable for our club events like the Triathalon (see Aeromodelling Digest 1991), Slow Combat and Balloon Burst, as well as sports aerobatics. Top Gun uses over-the-counter technology and no-frills construction, with the biggest concession to appearance being a nice, racey fuselage with spinner and cheek cowl. The fuselage shape owes its heritage to a racing model designed by Paul Cameron.

There have been some refinements made to the plan relative to the prototype. The prototype came out very nose heavy and needed the engine to be shifted back, which then meant that I did not have the space for the intended Perfect brand #8 tank. To correct this I have redrawn the plan to lengthen the fuselage by 30 mm between the wing and tailplane, and beefed up the tailplane to 5 mm thick instead of 3.2 mm thick balsa. The trailing edge strips on the prototype were only 20 mm wide and of quite soft 1.5 mm balsa. When assembled the wing felt rather weak and, as I wanted to avoid relying on covering for strength too much, changes were made: a 30% increase in the width of the trailing edge pieces and harder wood for the spars, leading edge, trailing edge strips and fixed flaps.

OPTIONS

The standard wing construction should be fine for stunt flying, but may be found wanting in those negative clearance manoeuvres that are almost inevitable in the heat of a combat battle. The wing on the prototype was beefed up with 1.5 mm balsa webs between upper and lower spars to improve spanwise stiffness. If, however, you intend to engage in gloves-off combat, use the sheeted leading edge version ribs drawn on the plan. Sheet the wing, top and bottom, with light A grain 1.5 mm balsa from the leading edge to the spar. A grain can be picked by the sheet being easy to bend across the width of the sheet. Wet the **outside** surface of the sheet with water, as this will assist in getting the sheet to bend. Use lots of pins to hold the sheeting to the ribs and spars. A slow set PVA glue like Aquadhere will give you sufficient working time. Keep the wing weighted down flat on the building board during sheeting.

The balsa cheek on the LHS of the fuselage is there to enable the nose to be shaped to match the spinner and hide the undercarriage leg and straps for that neat look, but it also has a functional purpose. The extra material in cross section stiffens the fuselage and helps minimise the chance of the fuselage to wing glue joint cracking - a nasty repair job if fuel gets in the crack. It also helps to keep fuel frothing in the

Another view of Top Gun. Like any implement for battle, it has to be tough and reliable.

tank under control. The simple slab profile with ply each side will, however, be quicker to build and quite functional.

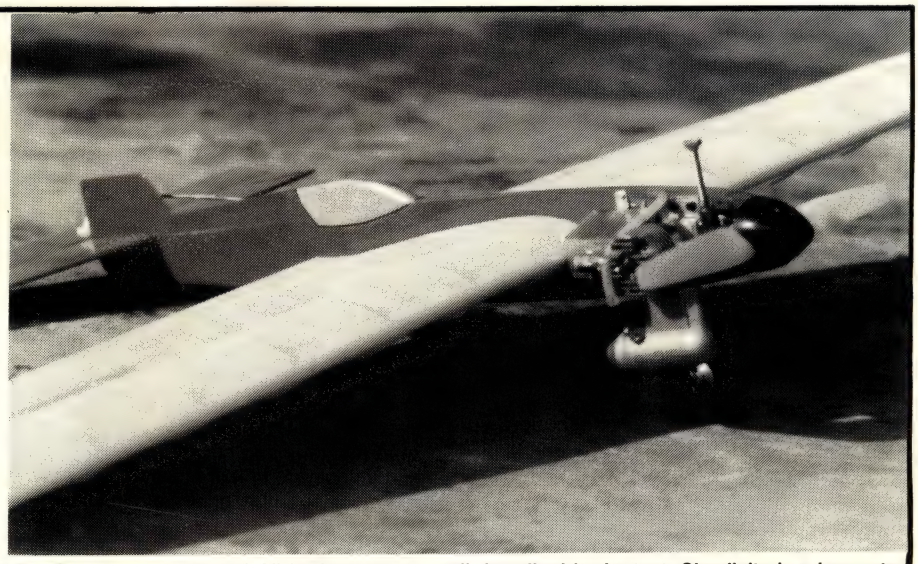
CONSTRUCTION

Caution: The straightness of your wing will depend to a fair extent on how straight your 6.5 mm leading edge and wing spar stripwood is, and whether all ribs meant to be the same **are** the same.

Wing

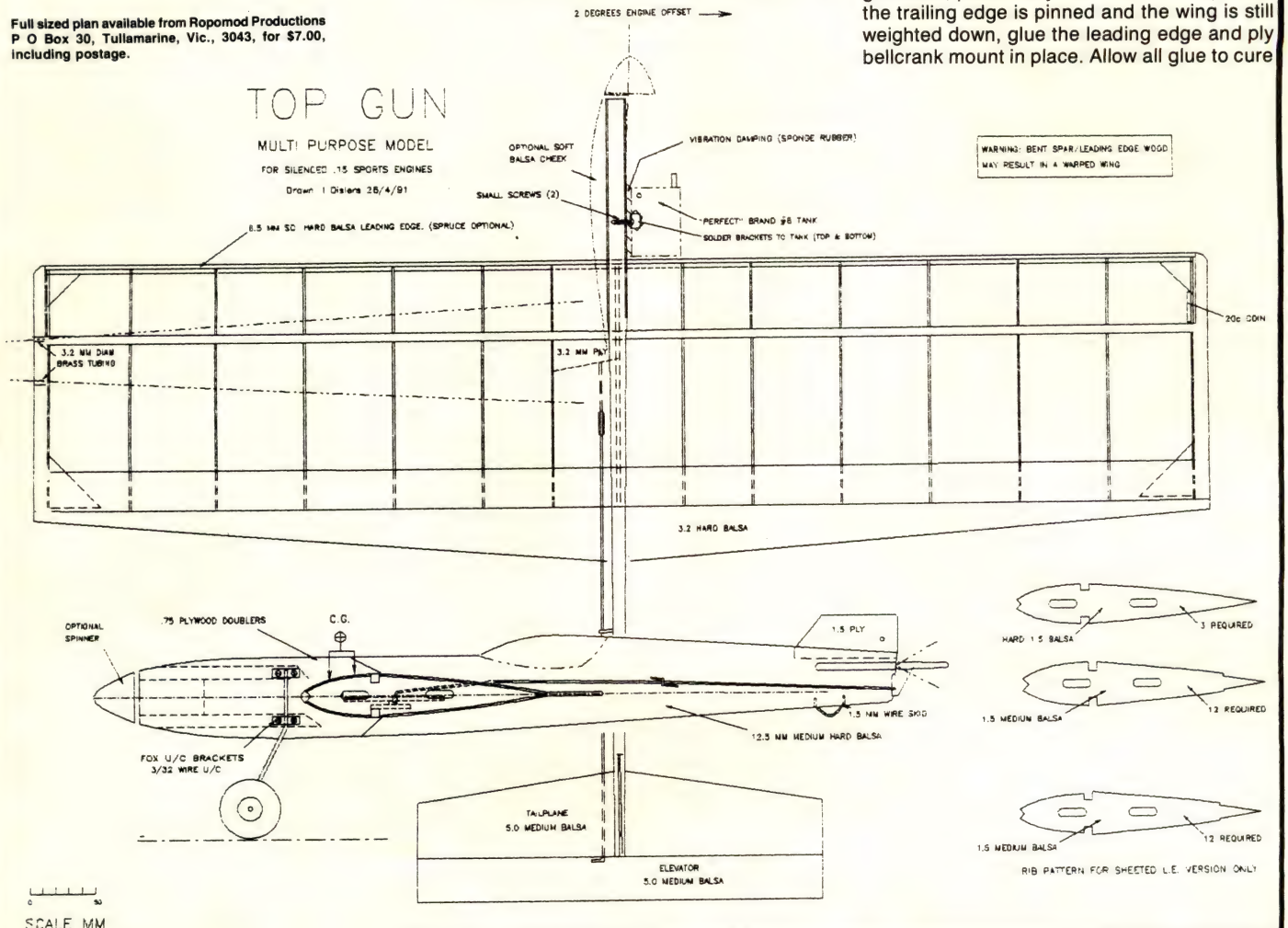
It is suggested that ribs be made by the sandwich method; i.e. mark a LE and TE reference line of the stack of blanks, align a rib template either side of the stack of blanks, clamp or pin the whole lot together, drill undersize lead-out holes through the stack (elongate and neaten up with a small file), then carve and sand the blanks all as one down to match the templates. Use a razor saw or a junior hacksaw for LE and spar notches. Cut notches and trim length while all ribs are pinned together; check spars fit and adjust notches until they do fit before unpinning. The 3 centre ribs can be cut out individually using the paste-on pattern idea, pinned together and sanded till identical. Stripwood is not always perfectly square or exactly 6.5 mm. Cut notches to suit your spars whatever actual size they are; not too sloppy a fit.

The following sequence of wing construcrtion is recommended. Mark rib positions on spars and bottom trailing edge piece. [Hold all pieces together and mark all at once.] Elevate the bottom main spar on 6.5 mm support blocks, about one every rib bay, and slip the ribs onto the spar. DO NOT GLUE YET. Pin bottom trailing edge strip to plan. Glue ribs to trailing edge (check that ribs are at 90 degrees and line up with the plan from above). When dry, glue top trailing edge strip in place and pin down the trailing edge before the glue dries. I use C-30 (aliphatic resin) here. Slip top spar into rib notches. Place weight along the main spar to keep the assembly flat to the jig blocks and glue ribs to spars with thin CyA glue; i.e. Zap, Magic, Hot Stuff. (I like to go over these joints with C-30 glue later, particularly the 3 centre ribs.) While the trailing edge is pinned and the wing is still weighted down, glue the leading edge and ply bellcrank mount in place. Allow all glue to cure



Top Gun means business! All its features are well described in the text. Simplicity is a key note. Dislers photos.

Full sized plan available from Ropomod Productions P O Box 30, Tullamarine, Vic., 3043, for $7.00, including postage.



thoroughly and only then unpin the trailing edge and remove the wing. Fit a 75 mm (3 inch) Aeroflyte or similar 75 mm bellcrank. (Large bellcranks and long horns give better control power to light line tension situations.) Repin flat to the board while sheeting the leading edge. Sheet the centre. Add block tips, tip weight and triangular gussets. (The position of the brass lead-out guides and amount of tip weight is important - do not change them unless you understand the effect that it will have.)

Fuselage.

Mark out the fuselage, including parts cut out for engine bearers, wing and tailplane. Use either the pin prick through the plan, or the photocopy and heat method. Use a coping saw to cut the shape, unless you can get access to a power scroll saw or band saw. Take care to keep the blade at 90 degrees to the work. The cut-outs for the wing and slots for engine bearers need to be as accurate as you can get them; i.e. least possible gaps. Cut undersize and file to the line. Rock maple is the best engine bearer material, but you may have to use what you can get. 1 mm ply or even 1.5 mm ply can be substituted for .75 mm ply if you cannot get the smaller size.

Control System

Use a 3 inch bellcrank and large horns to give moderate gearing and about 30 degrees elevator movement. Also use some sort of pushrod guide to limit pushrod flex; e.g. eye and legs cut from safety pin. The horn was mounted on the top of the elevator on the prototype. This looked a bit unsightly. As we ARE using a pushrod guide, I suggest that you mount the horn underneath and hide it.

Fuel Tank

In keeping with the KISS philosophy, I drew a Perfect #8 over the counter type tank. Solder some thick tin plate brackets to the tank so that it can be screwed to the fuselage with sheet metal screws. Clamp some cloth or sponge foam between the tank and the fuselage and your fuel froth blues will be a thing of the past. Try different materials until you see least bubbles coming through the fuel line while ground running on an undersize prop (simulating in-air rpm). Try both suction and muffler pressure.

Suitable Engine

Top Gun was designed for stock standard basic sport engines with a silencer; e.g. Enya 15, OS 15 or Thunder Tiger 15. The higher performance .10 to .12 engines would also work well. A not fully run-in, muffled Enya 15 powered the prototype through loops, wing-overs, eights and square loops on the first flight. The muffler will help you get a more even engine run on a slightly rich setting, which is just what you want.

Finish

Use an iron-on covering. The prototype was covered in fluorescent yellow Solarfilm. This certainly made it visible and will hopefully save it from an accidental bellcranking at some future combat bout. Clear or transparent films, however, offer the advantage of being able to see any damage or fuel seepage. The finish of the fuselage and tail was enamel, fuel-proofed with Glasscote. The original weighed 500 grams ready to fly less fuel, but a reasonable target weight with the stronger wing construction shown on the plan would be 525 grams.

Flying Trim

Before flying, make certain that the wing does not look twisted. A twist or warp can develop while shrinking the covering. To correct, twist in the opposite direction beyond the straight point and hold in this position while reshrinking the covering. The fin on this design is small and not really enough on its own to keep line tension. The primary device used is the 2.5 degree line rake relative to balance point, also known as centre of gravity or CG. The tip weight and about 2 degrees engine offset (out thrust) are also important. File up some tapered aluminium engine pads to get the offset. Washers under the engine mount crush into the fuselage, but slack modellers use this methd; the only thing going for it is that it is quick and easy.

If your engine runs richer upright than in inverted flight, lower your fuel tank slightly. If the outboard tip is not level; i.e. high in upright or inverted flight but not both, you have a warp in the wing, or the flaps are not level with each other. Looking from behind, raise the flap or trailing edge on the wing that is flying high. Wingtip high upright and inverted requires more tip weight to remedy. Try more engine offset if line tension seems light. Choice of propeller affects line pull also. An 8 x 4 or 7.5 x 6 should give better tension than revving way beyond the torque peak with a 7 x 4. If Top Gun seems too sluggish, add weight to the tail before increasing control gearing or elevator throw. If Top Gun is too touchy, check that you do not have excessive elevator movement first before adding weight to the nose. Bouncy landings can be cured by bending the undercarriage to a more rearward position, and nose-overs by bending it forward. A little time spent fine tuning your model will be well worth it.

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Expert Class - X-Cells 1st, 2nd, 3rd, 4th, 5th.!!!
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And in 20 to 30 mph winds!

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Expert Class - X-Cells placed 1st & 2nd against All Comers
Intermediate Event - X-Cell placed 2nd.

AUSTRALIAN 1990/91 NATIONAL TITLES
X-CELL 60 Placed 1st & 2nd in F3C Event and 1st & 3rd Intermediate

And this impressive list goes ON and ON .....

Rob Barbuto (right) 1st place '89 Nats; Geoff Woodward (left) 2nd.

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PREMIER

KIT REVIEW

TIGER MOTH

SPECIFICATIONS (as stated)

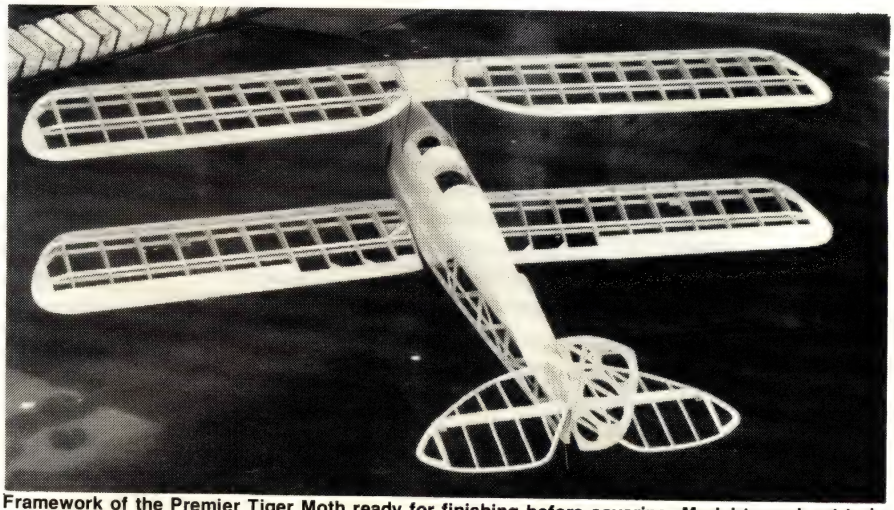
Wingspan:	66 inches	1.676 metres
Scale:	1:5.33	
Wing area:	1300 sq in 9 sq ft	83.87 sq dm
Weight:	8 to 10 lb	3.64 to 4.55 kg
Wing Loading:	10 to 12 oz/sq ft	30 to 36 gr/sq dm
Engine:	40 to 90	6.5 to 15 cc
Controls:	4	

Introduction

As with all good kits, the Premier Tiger Moth is well packed in a nicely decorated box and should travel without any damage. The Tiger is perhaps the classic scale model, certainly for bi-planes, and this kit should put it within reach of any modeller as far as price is concerned, although it is for the more experienced builder because it is a complex aircraft.

Materials

The wooden parts were nicely grouped: simila items were taped or banded together. The wire parts, the hardware and the small balsa pieces were in separate plastic bags. Many of the components were made of light plywood; these sheets and the ribs and fuselage formers were very well die-cut.

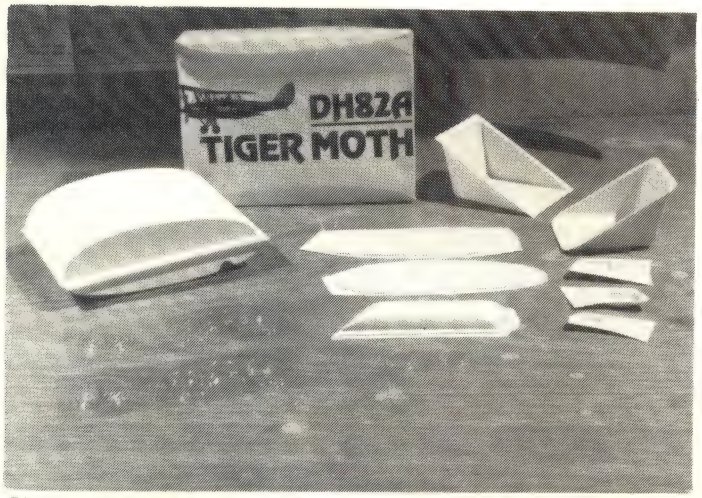


Framework of the Premier Tiger Moth ready for finishing before covering. Model turned out to be 67½ inches span.

There were three plastic engine cowl pieces, and a separate box of plastic parts for the top wing fuel tank and cockpit fittings. Parts were also provided for open or closed cockpits. Pushrods, clevises and horns were included.

The Instructions

The plan was well drawn with parts all numbered, showing starboard halves of the flying surfaces. The paper had to be turned over and oiled to show the lines for construction of the port



Plastic parts of the Premier kit. Fuel tank for top wing, cockpit instrument panels (transparent, left), oil tank, seats. Thin, light moldings.

Engine cowlings for the Premier Tiger Moth. Strong, tough plastic. Neat SLEC fuel tank supplied in the kit.

flying surfaces. There was one sheet for the fuselage and empennage, one sheet for the wings and one sheet for floats. No materials were provided for the floats.

The instruction booklet included a list of parts by number, some 3-views of Tiger Moth variants and detailed assembly instructions using the numbers on the plans. A couple of wrong numbers were found but did not cause any problem.

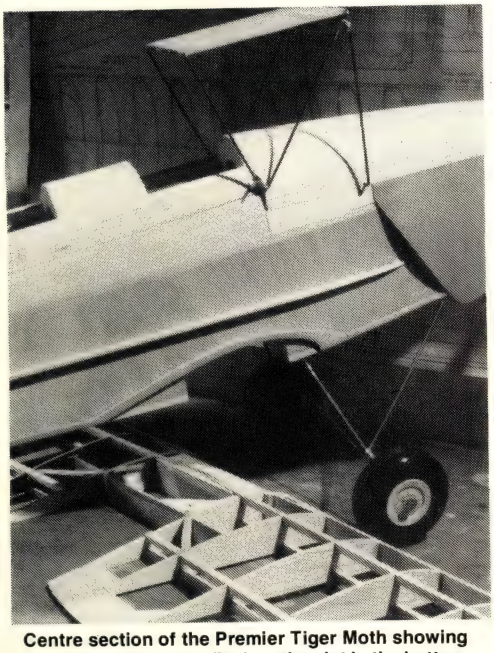
The Parts

All the wood parts were weighed before assembly to ensure that a balanced airframe was produced. The instructions advised the use of a knife to help separate the die-cut parts from their sheets, but this was barely necessary as the cutting was clean and complete.

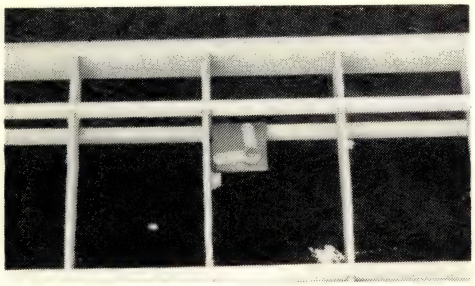
The fit of the parts was very good. The instructions pointed out that the plans could expand due to age or humidity and that the parts should be used to set the size of the framework rather than be trimmed to suit the lines on the drawing. Only a slight shift of the wing spars was needed with this particular kit.

The simple nose frame was assembled from parts cut from hard wood provided, and needed some care. The accuracy of the parts provided a good fit of the bottom wing to the fuselage.

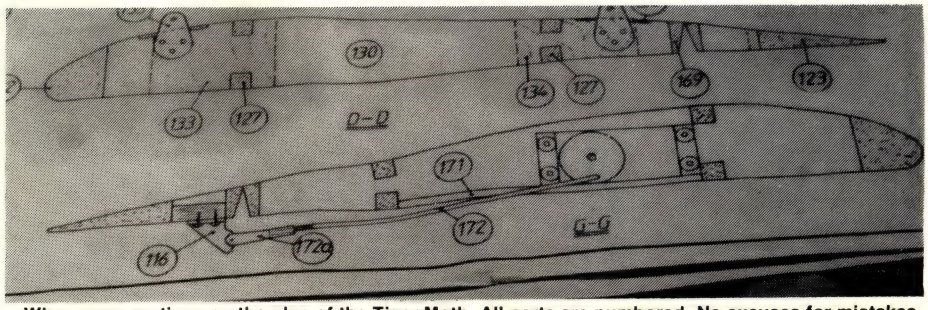
The plastic cowl parts were trimmed to the line with large scissors before the sanding technique described in the instructions could be used.



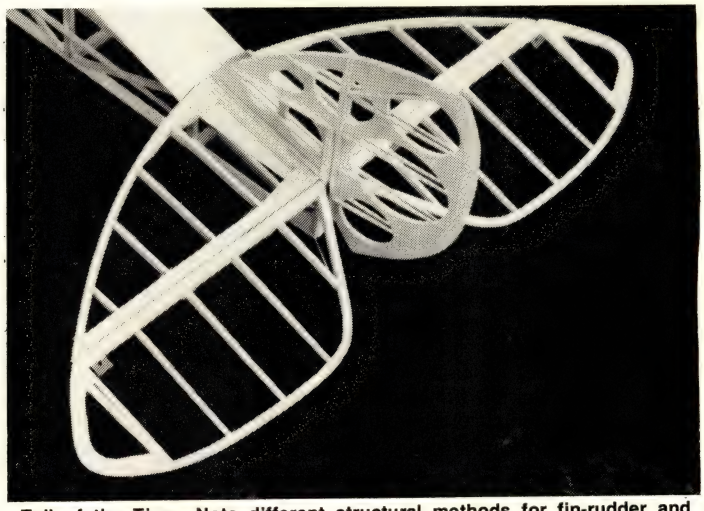
Centre section of the Premier Tiger Moth showing how the bottom wing fits into the slot in the bottom of the fuselage. A good fit. Wing is held in place with two nylon bolts supplied in the kit.



Aileron bellcrank, on the bottom wing of the Premier Tiger Moth. Servo is mounted in centre section.



Wing cross sections on the plan of the Tiger Moth. All parts are numbered. No excuses for mistakes if you can count!



Tail of the Tiger. Note different structural methods for fin-rudder and tailplane-elevator. The latter is much lighter.

The undercarriage was easily soldered together since the parts were bent to shape accurately and the wire was zinc-plated.

The tailplane parts were not die-cut and had to be traced from the plan onto balsa sheet provided. To match the accuracy of the wing was perhaps the most difficult part of construction, but was not really difficult at all. The fin and rudder were die-cut from plywood and balsa strips were glued across then shaped to the aerofoil section. This was fast and quite good fun.

The balsa sheet for the curved fuselage top was too hard to bend, so it was cut into tapered strips and the turtle-deck was planked; quite an easy operation.

Tidying Up

The undercarriage went on as prescribed. The wheels were molded plastic with straight treads.

The top wing mount was also easy to assemble (another simple soldering job) and install. Smoothing the woodwork around the wires in the cockpit area was a little slow but not difficult.

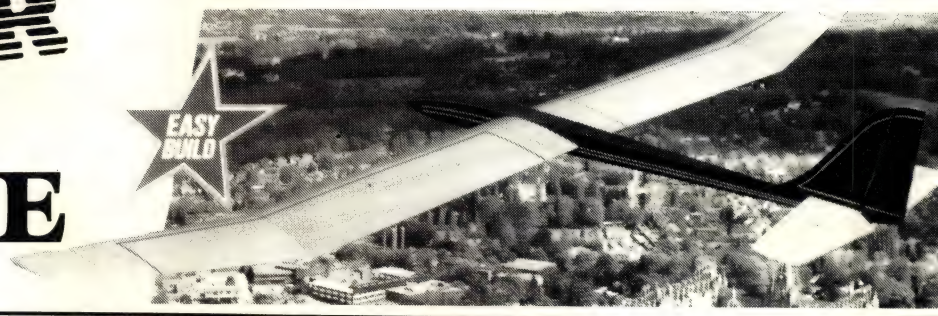
The airframe has yet to be finished and covered.

There is no doubt that the Premier DH 82 A is a very good kit, limited only by the constraints of kit manufacture, and that it will provide an enjoyable and educational construction project for a reasonably experienced modeller. All materials except glue and covering (and a few tiny screws) are provided. Their quality and the fit of parts is good. The instructions are different. A few construction illustrations would help but are not essential. This is a real modellers' style of kit.

M.B.

To be continued

PREMIER NEW GRADUATE



AND ELECTRO GRADUATE

A 100s 2-FUNCTION RADIO CONTROL THERMAL SOARER FOR THE GLIDER ENTHUSIAST

COMPREHENSIVE HARDWARE PACK...Includes Hinges, Horns, Clevises, Push-Rods and Tow Hook.

- ***The kit contains materials and instructions to build either version.***

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Wing Span: (2438 mm)	*96 inches*	*Length: (117 mm)*	*44 inches*
Wing Area: (51.63 sq dm)	*800 sq inches*	*Weight: (1.3 kg)*	*40 ozs*

PREMIER TIGER MOTH

66 inch scale aircraft for discerning modellers.
Kit includes die cut balsa and ply, pre-formed wire parts, blue-print plan, comprehensive instruction book, plan and instructions for floats, skis and covered cockpit, scale details and rigging, vacuum formed cowl parts.
L.O.A. 55 inches, weight 8-10lbs, Radio 4 function, engine .40 to .91, wing loading 10-12 oz/ft².

PIPER CUB

A 106 inch (2.7 metre) SCALE AIRCRAFT FOR THE CONNOISSEUR

1:4 Scale

THE KIT INCLUDES

Unique die cut light plywood & balsa construction.
Parts 'snap' together for simple, fast assembly.
Superbly drawn blueprint plan with schematic diagrams & drawings including FLOATS.
Comprehensive instruction book for step by step assembly by numbers.
Vacuum-formed front cowl and pre-formed wire parts.
Scale engine cylinder kit.

★ Superbly engineered functional scale undercarriage & tail wheelspring.
★ Comprehensive hardware pack wich includes wheels, hinges, quicklinks, control horns, nuts, bolts, control rods, aluminium sheet etc.

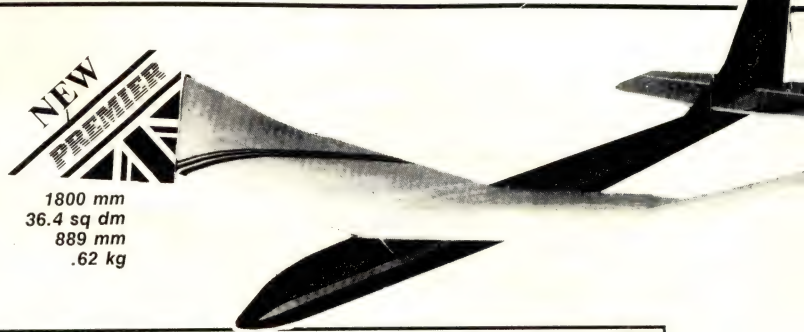
Wing Span:	*106 inches; 2.7 Mtrs*
Length:	*67 inches*
Weight:	*14 Lbs*
Wing Loading:	*14-18 ozs*
Engine:	*20-30 cc*
Radio:	*4 Channel*

FRESHMAN

AND ELECTRO FRESHMAN

An 1800 mm, 2 function RC Soarer for Slope or Thermal.
Can be easily converted to electric flight with the addition of an electric flight pack (not included in kit).
Selected balsa wood, hardwood spars and wing braces.
Comprehensive hardware pack included.

Wing Span:	*1800 mm*
Wing Area:	*36.4 sq dm*
Length:	*889 mm*
Weight:	*.62 kg*



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Affiliations

As at the 30th June, affiliations for 1990-91 and 1991-92, by State & Territory Associations, were: MAAQ, 1322 and 217; RCAS(NSW), 2335 and 19; NSWFFS, 76 and 0; CLAS(NSW), 129 and 0; ACTAA, 172 and 0; VMAA, 2299 and 199; TMAA, 171 and 0; SAAA, 639 and 5; AWA, 618 and 122; and NTMAA, 152 and 3; for totals of 7917 and 629. It is too early yet to assess whether the recession will affect membership numbers. Hobby shops are giving mixed signals on the state of the sport; some report poor business while others seem to be selling. I again remind you that aeromodelling offers a range of interests. A simple Hangar Rat, costing just a few dollars as a kit and probably nothing from the scrap box, can provide as much fun as RC aircraft - probably more because they are almost indestructible. CL models are not as expensive as RC but, if you do take them up, fly them at your club field in an area approved by the club committee. You will probably need some instruction; start with a trainer and not a stunt model.

Insurance - Safety

A control line mechanic in a team race was recently struck in the face by another competitor's model released only four metres from behind where he was pitting. In the club newsletter he described his immediate thoughts (had he lost an eye?), and then asked a series of questions about safety and insurance. The team race during which the accident occurred was part of a Triathalon, a multi task event described in the 1991 Aeromodelling Digest (compiled by your editor), and is not one with rules in the MAAA Rules Book, although the line length equates it with 2.5 cc Rat Race. Experienced CL flyers, however, would apply relevant rules from the other team race classes but, as the injured member points out, he and his son were not experienced, and others in the race may also have been novices. Had the segments with pitting areas described in the rules for team or rat races been used properly, the model would have been released at least 12 metres further back than from where it was actually launched. It is impossible to allocate blame; the excitement of the race makes the descriptions of events confused. It is likely, as in most accidents, that there was a sequence of errors in supervision and conduct of the event. Correction of any would have altered the result.

Our injured member also asked "Who pays?", putting the cost of the accident at about $500, including the loss of a days work. What he must do is claim on the pilot. Under the conditions of the MAAA cover, the flyer of any model involved in an incident must advise the Underwriter of the incident as soon as possible, and also forward any claims arising from that incident as soon as they are received. Property damage claims are usually straight forward; the cost of repair or replacement is real, made up of parts and labour. The files on such incidents are closed fairly quickly. Personal injury claims are a different matter. Sometimes the full effects of injury may not become apparent immediately. The previous MAAQ(Inc) Secretary, Cec Bardell, who works with the insurance business, explained to me that, for such claims, the Underwriters have to set aside (figuratively) a sum of money which may not be paid out for several years. For example, a claim arising from a CL accident in 1974 was not settled until 1980 or 1981. For this reason, it is necessary that all incidents be reported, even though the person injured is certain that he is OK. It is no use his seeking compensation in several years time if the person whose model caused the injury has few, if any, assets and the Underwriter was not advised.

Also asked were "Who is covered?", "Against what?" and "For how much?". The last is the easiet to answer. $5 million with a $250 excess on property damage. The "Who" is all financial members of the Association, plus newcomers to the sport, who are permitted two flying sessions before they pay the fees, provided that their names are entered in a book kept at the club's flying field for that purpose. Members of overseas model aviation organisations who are attending competitions here are also covered. Cover is valid only within Australia and its Territories. USA and Canadian court awards are not covered. The contingencies is the most difficult part to answer. Generally, any incident arising from the operation of a model aircraft is covered, but there are exclusions. Damage caused to your own property by your own model is not covered; nor is damage to other models. If the operation of the model is somehow contrary to law, cover may be void. In the past the Underwriter has accepted claims involving:

Injury during a working bee at a club field;

Injury to a horse that escaped through a gate left open by a model flyer;

Injury to a person caused when a fence on which he was sitting while watching models flying collapsed;

Injury to persons hit by models; and

Damage to cars and buildings hit by models.

All State and Territory Associations have a copy of the policy; one will be supplied to any club on request at nil cost, and to any individual member at the cost of photocopying plus postage; say $2.00. It is not a secret document; in the past seven years I have probably issued more than 100 copies on request.

Insurance 2

I mentioned that operation of a model aircraft in a way somehow contrary to law may void cover. This was highlighted recently when a club disciplined one of its members it found using RC equipment on a frequency not approved for licence-free use in Australia. The parent State Association asked that I confirm with the Underwriter that such use could affect cover. The reply drew attention to Condition 5 of the policy ... "The Insured shall take all reasonable precautions to comply with all statutory obligations,

Barry Angus of Melton with his Bucker Jungmeister at the Swan Hill scale weekend. Covered with Solartex and sprayed with Dulux gloss. Power is from a Webra Bully and Bolly 20 x 8 prop. Won prize for best finish. N. Hart photo.

Ern Eggins' Sukhoi crosses in front of the pits at the Swan Hill Scale Rally. Model appeared on cover of No. 101. Hart photo.

Colin Latch taxis his one third scale Sopwith Pup out to fly at the Swan Hill Scale Rally. Kit by Balsa USA is powered by a Saito 5 cylinder radial. Won Hi-Tec radio from sponsor, Model Engines. Photo from Neville Hart.

At the Swan Hill Rally, May '91, Wayne Harrison and Neil McKinnon, country singers, with Wayne's Supermarine Walrus. Nev. Hart with camera.

by-laws, regulations ..." and continued "We believe that someone using equipment that clearly cannot be used legally in Australia would be in breach of the policy condition and therefore would have no protection under the policy". The policy names, as the "Insured", as being The Members which includes the individual members of clubs. Thus each of you is required to take all reasonable precautions ... etc. It is for this reason that, in past columns, among other things I have urged you not to fly on Council or Shire property without checking that it is not forbidden by by-law, and also I have periodically reminded you about CAO 95-21.

CAO 95-21

The Federal Government's policy on cost recovery or 'User Pays' is being applied to model aviation through CAO 95-21. As you know, model aircraft may not be flown above 300 feet above ground level except at designated model flying areas unless the appropriate CAA area manager gives approval. For some competitions the organisers seek approval to fly models above 300 feet on one or two specified days in an area like Canowindra. The cost of such approval is now $130, plus another $15 or $20 to cover the issue of a NOTAM. This has to be recouped from entry fees. Peter Smith, our CAA liaison man in Canberra, has approached the Department several times on our behalf, but it will not delegate to the Association the right to self-authorise or of self-regulation. (Other aspects of model flying also can attract a fee; for example, approval to fly a model weighing more than 15 kg or to hold a flying display requiring new approval or a variation of an existing approval.) A problem arises with a reported rebellion against the level of the charges; there is some talk of ignoring the requirement to obtain approval. This cannot be condoned, if only because of the possible effect on insurance cover. We may agree that cost recovery is a bad law, but it is government policy and it is unlikely to be overturned by any future government. The MAAA will continue to seek to have the charges reduced but, irrespective of the outcome, we must comply with the law.

The restructuring of CAA in line with government policy will affect other branches of sport aviation. Within CAA, the appointment of dedicated sport aviation inspectors or supervisors in each state has been ended. Further, grants made to such bodies as the Parachute Federation, Gliding Federation and the Ultra Light Federation for self-administration are to be phased out, over three years according to the government, but over two years according to those affected. If the groups are to contiue their work on safety and regulation they will each have to find up to $60,000 extra per year. That will make for a hefty fee increase.

The MAAA(Inc) has never depended upon a government grant in preparing its budget. The only grants we have received were through our membership of the Australian Sports Aviation Confederation; they were two grants of $1,000 each for attendance at overseas conferences.

Combined World Championships

By the time this is published the start of the World Championships for RC Aerobatics, Helicopters and Pylon will be only weeks away. The organisers have done their best to bring you information about the events, with inserts in State Association newsletters, direct mailings when possible and handouts at hobby shops. I hope to see you at Wangaratta in October.

Far North Queensland

I was able to visit my daughter, her husband and my grandchildren in far North Queensland in June, and took the opportunity to visit four club flying fields there. I am sorry to say that two of the clubs have but a tenuous hold on their fields. One shares the use of the field with a polocrosse club who, in theory, are the primary users. In practice it seldom uses it, but is now about to host a series of games for which it intends to harrow the surface of the field and its surrounds so that the horses will not slip on the grass. The polocrosse club also intends charging the aeromodellers what can be described as a 'green' (or 'dirt') fee - an individual charge for each day's use. This club also has a problem with a neighbour who complains that the noise of the models disturbs his crocodiles - a crocodile farm adjoins the field. The club has a problem finding a new field. The whole area around Cairns is too mountainous, developed or under sugar cane which is too profitable to forego planting a few acres. Land prices are consequently horrendous; small blocks of land at Gordonvale, about 20 km south of Cairns and where I lived for 7 or 8 years as a child, start at $34,000.

The club on the Atherton tableland flys off an ultralight strip surrounded by rice paddies near Mareeba. Fifteen years ago Mareeba was surrounded by tobacco farms. I saw none on this visit. The club has no problems with the field, although it is well hidden and someone living in Atherton has to drive more than 30 km each way to fly. I do not have to travel half that distance to my club field at Sunbury.

Members of the Townsville Aeromodelling Club (ex CHARMA) have to travel a similar distance to their new club field on a water reserve area on the other side of a mountain from Townsville. The field is truly isolated. At present it is necessary to open a locked gate to the reserve to reach the field, but the club hopes to reach an agreement with the city to reposition fences to make this unnecessary. The other Townsville club, TRACS, flys, with permission, on land owned by a meat works which has recently been sold. The attitude of the new owners has not yet been determined, but the

situation has not been helped by non-members of the club flying at the field at times other than those agreed, and worse, flying their models over the buildings.

Townsville does not have a hobby shop as such, or if it does it is not listed in the yellow pages and is not known to club members. (A Darwin and a Brisbane retailer are listed in the Townsville and Cairns yellow pages.) Cairns has a Cairns Hobby Centre, but it carries only a small amount of model aircraft supplies because, according to the owner, one of the club members operates a back yard shop and he is not able to match the prices. However, he was prepared to order any item on request. While the back yard dealer probably offers excellent service to club members, there is little or nothing available to entice newcomers. On a similar matter, I do not recall seeing one model aviation magazine in any of the several newsagents I dropped in to.

One of the clubs has elected, as is its right, not to use the keyboard system, but uses clothes pegs to control transmitter use. While I was at the field one flyer found that the peg he required was not on the rack so, apparently believing that it had been put back in the wrong spot, took the one next to the vacant place. Of course, the 'missing' peg was in use. As fate would have it, the person who took the wrong peg crashed only his own model; the person with the correct peg was still checking his model in the pits!

I also witnessed the crash of an RC helicopter which had been purchased ready to fly from a beginner who had found the sport too expensive. The model had been flown for a total of about ten minutes in some four flights - hovering only - and was hovering at a height of about two metres when I saw the fuselage nod two or three times and then saw a rotor blade strike the tail boom. The pilot said that he heard something go past his head just before the rotor strike. Inspection of the wreckage showed a blade weight to be missing; it had apparently been secured with five minute epoxy with a far from good bond. No doubt there are some bargains to be had in second-hand models, but it pays to know the skill level of the builder. The use of weights in rotor blades - intended to improve auto-rotation - was a controversial matter at the International Aeromodelling Commission (CIAM) about four years ago. For a while weights on blades were banned on the argument of safety. I remember even the use of adhesive lead tape, which I had used on a Schluter Cobra back in 1973 without problems, being questioned.

Because hovering helicopters, in proficient hands, do not require a lot of space, there is a tendency to fly them close to the pits. This should not be permitted. They should be given a separate area, not under the flight path of fixed-wing models, a reasonable distance away from the pits, not only for safety reasons but because the noise of their engines close by robs other flyers of one of the cues to their models' performance. I am not anti-helicopter, but they, like gliders, have different characteristics from powered fixed-wing aircraft, and do not mix well. The same comment applies to CL, mentioned earlier. If these are flown on the same field as RC models, the circles must not be under the landing or take-off path of the models, nor should they be too close to the pits or the RC pilots.

RC Frequencies

I recently had a telephone call from a model shop asking me to assure a customer that RC equipment on Channels 50 (40.665 MHz) and 53 (40.695 MHz) were legal. I had no problem to do so. Those frequencies are legal for use for the radio control of models in Australia. There may be other reasons for not buying equipment on those frequencies - as mentioned in this column in the previous issue, there may be several sets in use in your club on those frequencies - but legality is not one of them. A full list of approved frequencies is in the Rule Book, but only about one in seven members owns a current book.

Field Purchase and Development Guidelines

The following guidelines for loans of MAAA funds to clubs for field purchse or development were agreed at the 1991 Council Conference:

Up to 50% of MAAA[Inc] available funds may be committed to loans for the purposes described in these guidelines.

Purpose of Loans

Loans may be made to affiliated clubs for the purchase of free-hold fields or for the development of free-hold and lease-hold fields.

Amount of Loans

Loans for free-hold purchase may be made for up to 50% of the purchase price, but not exceeding $40,000. Loans for field development may not exceed $20,000.

Repayment of Loans

A loan shall be repaid within ten years, except that any loan made for the development of lease-hold land shall be paid within the term of the lease when that term is less than ten years. As a minimum, interest only on the loan need be paid for the first five years.

Club Equity

A club shall be required to have a 50% equity in field purchase and development. For development, previously completed work shall be considered as satisfying all or part of club equity requirements.

Guarantee

The relevant State or Territory Association shall guarantee a development loan to an affiliated club. The MAAA[Inc] shall hold the first mortgage on, or shares in, a field purchased with Association funds unless the Field Purchase Sub-Committee otherwise recommends.

Processing of Submissions

A club requesting assistance shall submit its proposal to its State or Territory Association for examination. If it is within the guidelines, that Association shall forward the proposal to the MAAA[Inc] Executive for its consideration and recommendations to the State Associations for approval. The proposal shall not be held until the next Annual Conference.

Content of Submissions

Development and Field Purchase Loans

All submissions shall include a copy of the Certificate of Incorporation of the applicant club.

Development Loans

Requests for development loans shall:

a) detail the work(s) for which the loan is required; and
b) include a cost estimate and timetable for the completion of the work(s);
c) include a copy of planning approval for the work(s) from the relevant local authorities.

Loans for works that are staged may be paid for progressively.

Field Purchase Loans

Requests for field purchase loans shall:

a) include such details of the club so as to demonstrate its ability to develop the field and to repay the loan;
b) provide details of the land it is intended to purchase and the terms of the sale;
c) explain how club equity in the land is to be obtained; and
d) include either a copy of planning approval for the flying of model aircraft at the field or a statement from the local authorities that such approval is likely to be granted.

Special Field Requirements

The suitability of a field for model flying shall be determined by the relevant State or Territory Association. The proposal shall include a statement from the Civil Aviation Authority that there are no known current or future restrictions on the airspace.

Legal

All negotiations on land purchase shall be conducted through a solicitor. All legal expenses shall be the responsibility of the club.

Light conditions at the start of a race at Mt. Penang. No one has an advantage as yet.

Wind and Water

by Iain Kirley

MONARO CUP; Lake Bonney, South Australia

The Monaro Cup for match racing in RA class RC yachts was put up for competition again by the holders, the Riverland Club, located at Lake Bonney in South Australia, on the weekend of 29 & 30 June. Three clubs entered a total of eight boats to decide the challenging club: NSW's Bicentennial RC Yacht Club (2 boats), Monaro Club (3 boats) and the Adelaide Club (3 boats).

The Saturday was dedicated to sorting out which club was to challenge, sorting-out being the appropriate wording as the weather was not conducive to sailing but rather suited windsurfing or sitting in front of the fire. The wind during the day varied between 15 and 25 knots, which sorted out the boats. Four had retired by the end of the first of three rounds. The final round had Wayne Swinnerton and Alan Dawson fighting out for top spot. As fate would have it, Wayne had a problem, allowing Alan to bridge the two point gap. This resulted in a tie for top club. The two then sailed a best of three, with Wayne ending up the victor, 2:0.

On Sunday the weather was better for sailing, with the winds varying from 4 to 12 knots when the best of seven races commenced at precisely 10.30 hours. The Riverland Club had Rob Guyatt as skipper against Wayne Swinnerton from the Bi-Centennial Club.

In Race One Wayne shut Rob out and won the start by about 20 seconds. In flukey winds Wayne kept control of the race by covering every move made by Rob to catch him. The final leg involved about ten tacks, but Wayne won.

Race Two was the closest of the lot, with both boats leading at various times. At one point Wayne had a commanding lead but surrendered the lead after doing a penalty for hitting a buoy. Wayne came back with some skilful sailing to win a close race.

The final two races were non-events as the Riverland boat had minor technical problems, giving the races to Wayne by comfortable margins.

So, for skippers sailing RAs, the venue for Bicentennial Park's first defence of the Monaro Cup is Sydney, about July 1992.

PREPARING FOR THE NATIONALS

For all those who are entering the Nationals next January at Mount Penang near Gosford, NSW, it is time to make those modifications to your boat, rather than leave it to the Christmas holidays. I have been a prime culprit in the past for leaving these till the last minute and, in most cases, I have paid the price. Therefore I have prepared a list of what to do (in my case) to have the boat ready in plenty of time.

The Hull

1. I have to strip the boat of all fittings and check each in turn to make sure that there is no binding or corrosion.

2. While all the fittings are off the boat it will be checked for broken beams and damaged brackets on which equipment is mounted. The hull and deck will then be rubbed back with fine wet and dry paper, the deep scratches filled and the whole hull given a light spray.

Mast and Rigging

3. All stays will be replaced. Over the past two years they have not given a problem but I have noticed some wear and stretching.

4. All turnbuckes will be checked and oiled to prevent possible corrosion and prevent binding.

5. Spare turnbuckles, swages and hooks will be checked so that there will be no problems if a component fails.

6. The sails will be checked for damage and sent back to the sailmaker for repairs. If this is not possible a new jib or main will be acquired. At Mount Penang the wind is likely to be light in the morning with a sea breeze in the afternoon, so I will make sure I have a good light composite suit and a medium suit for when the wind gets above 10 kph.

Concentration shows on faces at the start. L to R: Wayne Swinnerton, Iain Kirley and Les Swinnerton.

Wayne Swinnerton's RA, winner of the Monaro Cup Challenge. Also has first place of the NSW RAs and second in the ACT RA Champs. Note the panelled sails.

Radio Equipment

7. All servos will be checked for corrosion on connectors and leads. The wiring harness will also be checked, and the switch will be replaced with a new one. This is because I have seen many competitors who have been in a good position Come to grief because of a switch failure. The nicad and gel cell batteries will be checked and replaced if necessary.

8. My radio set will be checked to confirm that it is within tolerances. (This is especially important if you have had interference in the past.)

9. The winch will be checked, lubricated and all lines will be replaced.

Final Checks

10. The boat will be assembled, rigged and returned in at least one, and preferably two club events. After all is sorted out the boat will be remeasured to ensure that it is legal to compete. Hopefully this will all be finished by the end of November.

A word of advice. If you don'y know how to check servos, send them back to the supplier to have them checked and then you will know that the job is done properly.

SAILS

I had a letter from a reader who wanted to know the difference between sails he has seen on RC yachts. Why are they different and how are they attached to the mast?

1. Differences — There are basically three different types of sail construction:

a. plain sails or the single plain sail;

b. the panelled sail; and

c. the composite sail.

All three do the same job but subtle differences can improve the sail aerofoil section and thus sail efficiency.

a. The plain sail is cut from a single piece of sail cloth with the sail shape and sail efficiency (air flow over the sail) being dependent on the skill of the sailmaker, the type of cloth used and the bend of the mast. The skill of the sailmaker determines the amount of curve in the luff so that when fitted to the mast the sail has sufficient camber for the conditions under which the sails are to be used.

b. Panelled sails are made from a number of panels of equal weight sail cloth. The sailmaker, when sewing the panels together, builds in a permanent curve across the width of the sail to give a more consistent and predetermined flow. Extra enforcement is often used in areas of high stress.

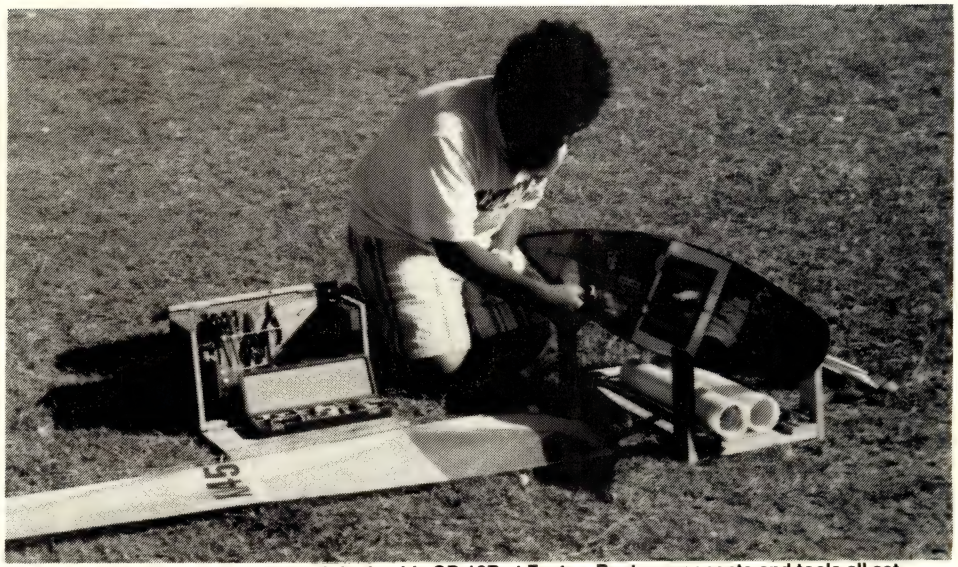
c. Composite sails, as their name indicates, are made from a composite of sail cloths. For example, in the case of my RA class yacht, my

Bruce Kennewell's modified Highlander RA. Note different sail type compared to boat at rear. Highlander has composite sails whereas the boat behind it has panelled sails. Hull makes radio Tx seem small.

lightweight main is from 0.5 oz scrim and 2.2 oz mylar, and my heavier main is a composite of 1.8 oz mylar and 2.5 oz mylar. These sails both have a relatively high aspect ratio of 5 (i.e. the sail height is 5 times the length of the foot). The benefit of the composite sail is that the lighter sail cloth will form the aerofoil section required in the lightest of wind strengths and the heavier cloth gives strength.

Aspect ratio is actually span divided by average chord, or for sails, height divided by half the foot (assuming constant taper).

With these more efficient composite sails available, why do the single panel sails still exist? The answer is simple - cost. A composite sail will cost twice as much as a single panel sail, and a panelled sail costs about midway between the two. However, if you are able to tune your yacht for maximum efficiency using a single panel sail you can win events. This was proved by Stephen Shepherd who won the Marblehead class at the Nationals in both Tasmania and Queensland with a Huff-N-Puff design and one set of sails.



The organised skipper! Alan Bicknel rigging his OD 10R at Foster. Boat components and tools all set out ready for the rigging sequence to begin. Forster photo.

Fitting Sails to Masts

There are a number of methods, including rings, a jackline down the back of the mast and a groovey mast.

The ring method uses rings that encircle the mast and hook onto themselves after passing through an eyelet in the sail. They are made from stainless steel and have hooks bent into the ends so that they can be clipped together. They also allow a fairly quick sail change. Another benefit is that they allow the sail to flop to the leeward side of the mast, allowing a good airflow. However, you have to have the rings just the right

10R sailing at Foster. Note skippers walking the bank to keep a close watch on their boats. Forster pic.

size so that the sail is not too close nor too far away from the mast.

The jackline is fixed down the back of the mast and allows sails to be hooked onto the line, thus allowing quick sail changes. This system has been common on RA class boats where the one mast has to be used at all times. The fixed line, however, does not allow the sail to move from side to side depending on which tack you are on.

The groovey mast allows for the luff of the sail to slide down a groove in the back of the sail. To use this system the sailmaker leaves a small pocket in the luff of the sail through which a cord is placed (called a bolt rope) of such a diameter that it will easily fit into the groove but be thick enough to prevent the sail from pulling out (except through the top or bottom of the mast groove). In some cases sailmakers use luff slides instead. These operate on the same principle as the rope but are only about 1 cm long and spaced at 10 cm intervals along the sail luff.

NEWS FROM THE STATES

Queensland

The office bearers for 1991-92 are: President, Ian Bullock; Vice President, John Tucker; Publicity Officer, Alan Loveridge; Treasurer-Secretary, David Black. For information on RC yachting in Queensland you can contact David at 11 Patwin Street, Oxley, 4075, or Alan at 4 Arkana Street, The Gap, Brisbane.

Tasmania

The Secretary in Tasmania, Ken Doddie, has forwarded contact officers for three of the Tasmanian clubs: John Leonard, 4 Arden Ave., Devonport, 7310 for the North West Model Yacht Club; Ian McElwee, 13 Denman Road, Trevallyn, 7250 for the Northern Tasmania Model Yacht Club; and Ken Dobbie, 26 Winbourne Road, West Moonah, 7009 for the Risdon Brook Model Yacht Club.

Western Australia

The new committee for 1991-92 is as follows: President, G. Dawson; Secretary, Doug Collins, 20B Purdom Road, Wembley Downs, 6019; Measurer, M. McEvoy; and Treasurer, M. Selby.

New South Wales

The new committee for 1991-92 is: President, William Grenfell; Secretary-Treasurer, Robert Shedden, 17 Aspen Avenue, Terrigal, 2260; and Public Relations, Ray Bennett.

The Northern Mariners, who sail at Hinkler Park at Manly also advised that their club committee for 1991-92 is: President, Henry Nehrybecki; Secretary-Treasurer, Wal McDonald 6 Vera Street, Eastwood, 2122.

The Rubber-Drive Propeller

by Joe Supercool

Noise generation by model aero engines is difficult to understand, and even more so to eliminate. Rather than blame a lack of mental acumen for this, I feel that the Devil has a hand in it. How else do you explain this? A Sydney control line modeller recently told me that he didn't need a muffler on his model as there was no noise problem at his field, yet, over twenty years ago, 27 out of 30 Councils banned control line flying from their municipalities. Surely the Devil made my friend say that.

However, Lucifer did not stop there. Consider this: on a given engine, the exhaust noise and propeller noise are equal, and the total noise level is 93 dB. A perfect 100% exhaust muffler is then fitted. Would you believe that the noise level then drops by only 3 dB, to 90 dB? Not only that, but the quality of the noise, its pitch, is nearly the same as the roar of the exhaust!

Confused? Good! Now to simplify matters by considering just one aspect of propeller noise. Ignore, for the moment, aerodynamic noise, vortices and such-like. This leaves mechanical noise.

Suppose that engine vibration is transmitted into the propeller so that the propeller acts like a speaker cone and radiates engine noise from the propeller. Then, in the same way that rubber mounts reduce noise from the airframe, surely a rubber mounted propeller has benefits to offer.

Accordingly, a Supercool 12 x 12 F3A prop was fitted with the rubber drive shown in the photos. This changed the roar of Chris White's YS 60 to a roar and a whoosh. No change in dBA (curse you, Satan!), but a new noise on the flying field!

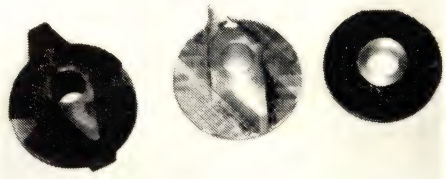
Well, the absence of a drop in dB was disappointing, but let's face it, 3 modellers talking at once make more noise than an F3A model at 3 metres. Perhaps there was a change in pitch that made the sound less objectionable. Accordingly, the sound of both a normal 12 x 12 and a rubber-mounted 12 x 12 prop were recorded and analysed for their frequency spectra. These are shown in the figure. The spectra are notable for the lack of strong harmonics. These harmonics are pure tones which make model engine noise so unacceptable. So, clearly, F3A noise, what with quiet pipes, rubber mounts and intake mufflers, is pretty innocuous to start with.

The differences in the spectra are important in judging performance of the rubber mount. These are fairly slight, with the rubber drive showing a concentration of sound at 3 kHz. Flying tests, although subjective, favoured the rubber drive. With noise bonus points at stake in F3A competition, the gains achieved by the rubber drive are worth having.

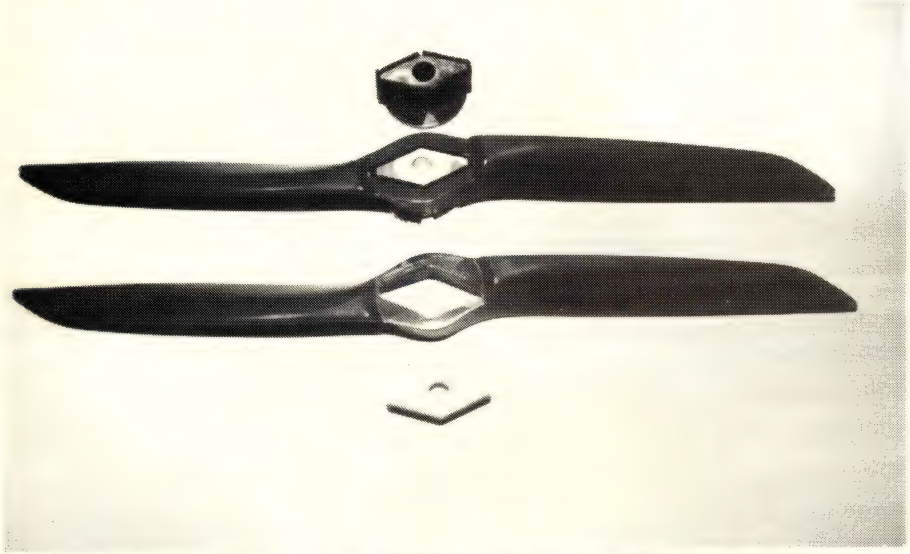
On the safety side, it should be noted that there is a pretty big hole in the hub of the rubber drive prop. Despite this, the amount of glass passing tip-to-tip has not been reduced from the regular Supercool 12 x 12. Only short pieces of glass, normally used to fill the hub, have been eliminated. The glass is unidirectional, from tip-to-tip. There is thus a possibility that the drive dog could split the prop lengthwise, as a lot of torque is being applied at a short radius. To eliminate this possibility, carbon fibre roving is wrapped in a circular fashion around the mould insert, giving, in effect, a cross-ply. No failure has occurred in the system, and no wear has been experienced in the rubber, which is replaceable.

The system has had many hours of testing, and was used effectively by Chris White at the World Championships in the good old US of A, where it created much interest. Both 12 x 12 and 12 x 11 quiet props are available with rubber drive. Call Stuart on (02) 607 3307 if you would like to try the system.

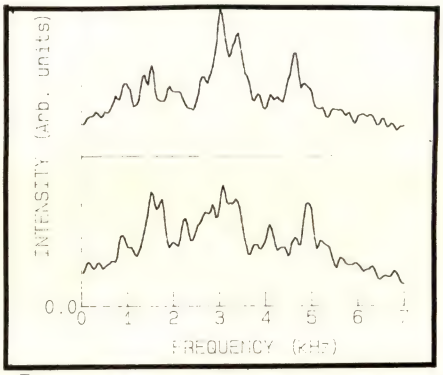
Rubber-drive is in series production. Machining costs are not cheap; add to the price. Drive dogs are milled from solid; only way to provide sufficient strength and accuracy. Rubber is an interference fit between drive dog and propeller; no slop.



Drive dogs, with and without rubber fitted. Front washer locks against the drive; prop cannot come loose. Prop is fully supported by rubber; does not touch metal anywhere.



Elements of the rubber drive for a Supercool 12 x 12 quiet prop. Lower diamond is an aluminium insert used to form the drive hole in the prop. Upper diamond is the drive dog with 1/16 inch rubber fitted.



Frequency spectra for Supercool 12 x 12 on heavily muffled YS 60. Lower curve is for regular prop, upper curve is for prop with rubber drive. Change in spectrum makes noise from prop with rubber drive more acceptable. Integrated noise level was 90 dBA at 10,000 rpm in both cases. Human ear cannot detect 1 dBA difference.

Pylon Roundup

by John Hughan

AUSTRALIAN MINIATURE PYLON RACING CHAMPIONSHIPS

Every year, on the Queen's Birthday weekend, all the keen and best pylon pilots take a leave pass to attend the AMPRA Champs. This year they were held at Cohuna. We try to keep the event as friendly as possible, and this year was no exception, as I did not hear one complaint. It makes it easy when you have expert help, and that is the standard that is expected at Cohuna. The Cohuna Club, headed by the CD, Steve Jenkinson, did a great job with such a high pressure weekend. We have three days of pylon racing: QM and FAI on the Saturday, with FAI continuing on Sunday morning, after which Formula S is run. ½A is flown on Monday morning. Unfortunately, due to constant rain this time the ½A event had to be cancelled. This is the first time in 15 years that an event has been abandoned; not a bad record. On the Saturday night we have the only national get-together of pylon pilots for the year, which is the AMPRA AGM. On Sunday night we usually all go out for dinner. This year it was at the Barham RSL. This is really a great weekend - you should come along next year.

At the AGM some interesting matters were discussed that should be known. Firstly, the pylon group are not wholly behind the idea of having a combined three event World Champs. Even though we have possibly the most exciting radio event, we will always play second fiddle to aerobatics because of the sheer weight of the numbers of F3A contestants; approximately three times that of pylon. So naturally Aerobatics get the prime time slots and pylon gets second, and this is why we commence flying at 7.30 am and finish at 10.00 am. There is a possible problem with the sun at such a low level, which can be rather dangerous when flying through it. Also, the problem of early morning changes in humidity, which affects engine performance. There have, however, been reports by Australian contestants who were at the last World Champs in America, that they did not experience any problems with the 8.00 am start with either the sun or humidity. Anyhow, it looks as though this time we are stuck with an early start. It has, however, been recorded in the minutes of the World Champs committee that pylon does not like the three event World Champs and would like it split next time so that pylon can run their own World Champs.

Another item of interest was what we should do about the F3K event proposed by England. This event is similar to Formula 40 Sports Pylon. It requires a 40 size non-racing engine running on 5% nitro unpiped. Scale F1 aircraft are mandatory. There are also some rather silly rules relating to how the undercarriage should be constructed which eliminates the pressed metal variety. It proposes cowled engines and a number of other things that stop innovation and forces scale models upon us - what's new!? The idea of this event could be to replace our great F3D or FAI pylon with this F3K, which is supposed to be quieter and less hassle to get going. The strangest part of these rules is that there is no mention of keeping the engines standard; in fact, there is not even an idle rule. So the hot-up merchants get into the act, and before long we have aircraft that are just as quick as our current FAIs, and kicking up just as much noise. It is really impossible to get high performance without increasing noise. This applies also to four-stroke engines. The best way to cut down noise is to slow down the revs and detune the engine. Anyhow, the result is that AMPRA was against this F3K in principle, and will vote against it; however, we will offer alternative rules based on our own Formula S, which I believe is the best in the world.

Les Bollenhagen, pylon enthusiast and prop designer and manufacturer, with his OD and kitted Piel QM - Super Tigre engine. AMPRA Champs.

There was a rather long discussion about how to cut down the noise of our aircraft, and everyone vowed to keep our pylon racers as quiet as possible. Bob Hyde was made a Life Member of AMPRA because of the dedication he has given to pylon over the last 24 years. Rick Thoms was also granted Life Membership because of the effort he has made to make pylon great in Australia, in particular being Australia's No. 1 starter. The Wagga Club was granted the right to hold the 1992 AMPRA Championships.

QM Pylon

Racing started at about 10.00 am Saturday morning. The Rossi engines have now taken a strong hold on the event, with all the placegetters running them. Ranjit Phelan blitzed the field; he won by a mile and had the best time of 1:06.9. He was flying a Langham Midget Mustang, and propped his engine to 30,000 rpm on the ground. The Rossi loved it.

Second fastest was Andrew Davies, but unfortunately he blew up his Rossi - said it was his fault for removing too much metal from the wrong place. Andrew was flying his new design, Davies Special - a very nice aircraft. I will be building one myself soon. He is kitting it at a very reasonable price. Phone him on (03) 430 1185 [BH] if you are interested.

Bernard Mackay was second flying a Piel design. This is available from Les Bollenhagen - a very fine model - glass work is second to none. Third was Keith harvey with a Folkerts design. Keith is very happy as he just dug this aircraft out of the pensioned off air fleet he has under his house, and the model flew very well. Actually, I have one of these models and it was great to fly; perhaps I should resurrect it - it needs a new wing.

Peter Tilley and Roger Thompson from NSW on the start line with ST 40 powered Murphy Mustang FAI. Did well for first FAI event.

It was good to see the Dynamic Duo - experts in Bar Room Ditties - Barry Murphy and Garry Turna, having a go at QM and doing well. And you could have knocked me over with a feather when Bob Hurst, that famous pattern flyer and builder, turn up with a CS powered Omega Junior. Bob did not have the engine sorted out for the AMPRA Champs; it looked to me to be a bit under-compressed. This is not unusual for any engine; none of them seem to go like a shell out of the box. They usually need some work on compression, head shapes , squish band clearances and plug selection before they work well for Aussie conditions. Some find that changing the port timings are required. I bet that Ranjit has modified his Rossi considerably to get the performance he now enjoys. I can assure you that significant engine performance can be achieved with just plug-in compression and shape optimisation without bothering with port alterations.

RESULTS

1. Ranjit Phelan (NSW)	272.0
2. Bernard McKay (Tas)	310.4
3. Keith Harvey (Vic)	310.4
4. Tom Jacobsen (SA)	317.6

FAI Pylon

This was the event we were all waiting to see. The CD, Steve Jenkinson, scheduled our three Aussie Team representatives, Roger Langham, Glenn Matthews and Ranjit Phelan, in the first heat. These three pilots really hate to be beaten. This was evident in the flying, with times that would make your eyes blink. Firstly Ranjit recorded a 1:08, which is two seconds better than the World Record. Glenn had a 1:12 and Roger a 1:13. This is the fastest heat ever recorded in Australia, and possibly in the world. Now comes the bad news; all three had two cuts each and were disqualified. They spent the rest of the day burning each other off.

Ranjit was trying to break the one minute barrier; this, of course, will put him in the history books. He was flying his Mustang design, Nelson powered, and had the best time of the day with a 1:12.6. He is now using a new wing that was designed and built by his caller, Stuart Maxwell. Stuart makes the wings from four individual molds representing the surfaces of the two wings. He molds each wing shell by placing 2 oz woven glass cloth in the molds, complete with resin, and lays over it the 3 mm balsa skins. The mold is closed and left to cure. He ends up with four shells into which he fits wing formers and carbon fibre spars. The end result is a very strong, very true wing.

Anyhow, I can assure you that our three World Champs team members ended up happy with what they were achieving. Glenn had a new aircraft, a Murphy Mustang, which looked great. Roger had the wrong props early but finally sorted them out and was pleased with his 1:15.0 clear in the last round. They will all be trying out the new Rossi 40 pylon engine that has just become available; perhaps this is what they will be flying at the World Champs. Anyhow, everything looks really rosy at the moment, and Airborne wishes them all the best possible luck for October.

I suppose you are all wondering who won FAI pylon. Well, it wasn't our team members because they were mainly interested in trying things out. It was won by a great mate of mine, Garry Davidson, who really gave everyone a lesson about how to get in front after the second round and stay there. If you look over the history of pylon racing, like I often do, you will notice that the person who has the best time does not always win the event. Garry's best time was a 1:21.6, but his model was capable of much better. He planned his race to win, and did so with consistent flying and zero cuts. He was flying a Midget Mustang with OPS (Holloway) engine. He has now locked up his engine and model for the next major event. It certainly was a very popular win. I even gave him a kiss.

Keith Harvey came second with a best time of 1:22.9. He has a very fast OS engine by Paul Classon in a Little Toni model. Third was Tom Jacobsen who was also flying an OS and Little Toni. Tom does his own engine work. Best time was 1:24.4. The best dice was between Karl Hague, the 18 year-old wonder-boy, and Ian Haigh, his one-time work boss. Both had very fast aircraft. Ian actually missed out on four rounds of the competition on Saturday because he thought that FAI was scheduled for Sunday only. His times over the last four rounds were excellent.

RESULTS

1. Garry Davidson (Vic)	589.5
2. Keith Harvey (Vic)	601.3
3. Tom Jacobsen (SA)	629.5
4. Brian Steele (Vic)	638.3

Formula S

As usual the Formula S entries were rather low, with only 14 entering. This is mainly the result of the relegation system that Victoria is enforcing, which promotes a contestant who wins three races over a twelve month period. This problem was brought up as an item during the AGM, and Victoria (VMPRA) is looking into the matter. The other states have no problem because they are not enforcing the rule.

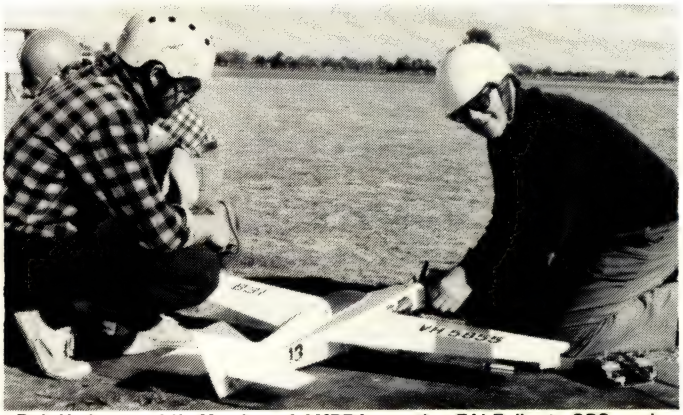
Stuart Maxwell with Ranjit's Nelson powered Mustang.

Patrick Clarke won the event with a rather interesting model. It was a China Clipper type fuselage onto which he fitted a nice tapered wing with a decent airfoil section suitable for pylon racing. The result was a very nice-flying aircraft. There were quite a number of FAI aircraft flying that were converted to Formula S. I think that this is a waste of money because they are no faster than good sports models. Keiran Harvey turned up with a Fire Breather. It was a very streamlined FAI Mustang fitted with a Nelson 45 engine. He bought this from Bruce de Chastel, and it wasn't cheap. This, I would say, is the fastest stock sports engine available in the world, and you will pay for this extra performance. Unfortunately Keiran did not get to grips with the model-engine, but it certainly was very fast. The Nelson spun a 10 x 6 Bolly prop at 17,000 rpm. Keiran had the fastest time with a 1:41.3.

RESULTS

1. Patrick Clarke (Vic)	551.6
2. Paul Wheeler (SA)	555.8
3. Bill Goodwin (Vic)	558.4
4. Roger Thompson (Vic)	563.2

Barry Murphy and Gary Turna (Murph & Turk) getting ready to fly Rossi - Midget Mustang at the AMPRA Champs.



Bob Hyde, new Life Member of AMPRA, starting FAI Folkerts OPS engine. Patrick Clark, winner of Formula S at the AMPRA Champs, holding.

Sponsorship

AMPRA has had enough experience for pilots to know that the championships will be a well run event, and will attend because of that. The prizes made available by the sponsors are a bonus that makes the racing especially attractive, and all the officials and racing teams would like to express their appreciation to the sponsors as part of this report. Our thanks go to: Aeroflyte, Australian Model Aerodrome, Bolly Props, Lion Electronics, Model Engines, Pricerite Engineering, X-Cell Products.

WORLD CHAMPIONSHIPS

Keith Harvey, the CD for these World Champs which will be held from Sunday 20th to Sunday 27th October, requires helpers to time, man pylons and so on. This is rather interesting work, especially at such a high level. If you are interested in helping, contact Keith on (03) 850 2423 [AH], or even better, fill out the official helpers form which you can get from your club or the State Secretary. This is the closest you will get to the racing and it is an opportunity not to be missed. Also, if you make yourself available over the full period of the Championships you will receive a special goody bag which contains a T shirt and a few other nice items. If you are not a helper you can look forward to paying $10 a day entrance fee and viewing the racing from a distance.

A.M.P.R.A. FEES

Those interested in finding out all about pylon racing, up to date results of competitions and who is doing what, join AMPRA, as the fees are now due.

Send $10 to John Hughan, 92 Hawthory Road, Kilsyth, Vic., 3137

PREMIER FRESHMAN

Constructed as ELECTRO FRESHMAN

by Bill Sneddon

Premier's Freshman is an 1800 mm wingspan, polyhedral, two function sailplane. The fully built-up construction makes this a floater style model, ideal for an introduction to soaring, though capable of extended flights with an experienced pilot.

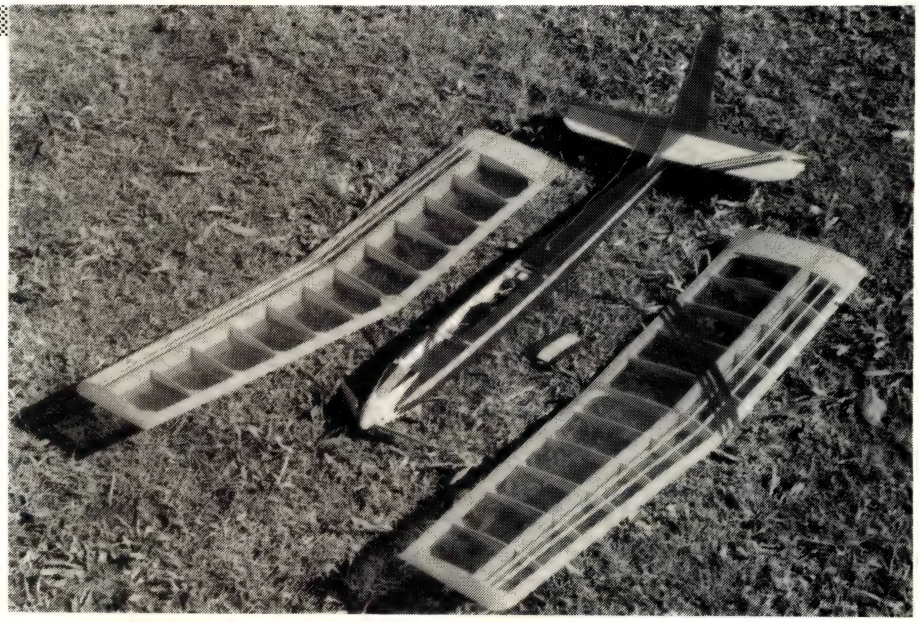
The kit comes attractively packaged with full colour box-top artwork of the completed model. Inside the tightly-packed box is a copious amount of balsa (mainly strip wood), with major components, i.e. formers, ribs and fuselage sides, die cut or already cut to size. The accessory packs supplied include all items required to fit out the sailplane version: horns mylar hinges, pushrods, servo connectors and molded tow hook.

A well drawn, folded plan is accompanied by a clearly written, comprehensive instruction booklet. Detailed construction modifications required for conversion to the Electro Freshman are slotted into the construction steps where building departs from the basic sailplane version.

This kit represents good value for money, since you need only supply adhesive and covering material to complete the model ready for radio installation.

Construction

This is entirely conventional, and well detailed in the kit handbook, so only the basics will be described here.



The **fuselage** is a simple box, constructed using 3 mm balsa sides, light ply formers and 1.5 mm balsa top and bottom sheeting. Large section triangular blocks in the nose allow smooth fairing into the spinner. Additional lower fuselage sheeting is suggested for the novice flyer, to reduce the risk of damage from heavy landings, though it's not essential for an experienced flyer. Access to the fuselage is via a clever plastic hatch on the nose that clicks into place under its own tension.

Tail components are all built up from supplied 5 mm strip and sheet balsa. These are light and adequately strong.

The open structured **wing** is constructed in four panels prior to joining into the polyhedral finished shape. Wing spars are 3 mm x 10 mm spruce, with adequate webbing shown. The review model was altered slightly to a two-piece, wire-joined style (for storage convenience) and double webbed for increased stiffness. The washout specified provides gentle stalls, with no nasty surprises.

The finished model was **covered and trimmed** using Solarfilm.

The **electric conversion** instructions show a simple on/off switch motor control using a standard 540 style motor with unspecified folding propeller and battery packs.

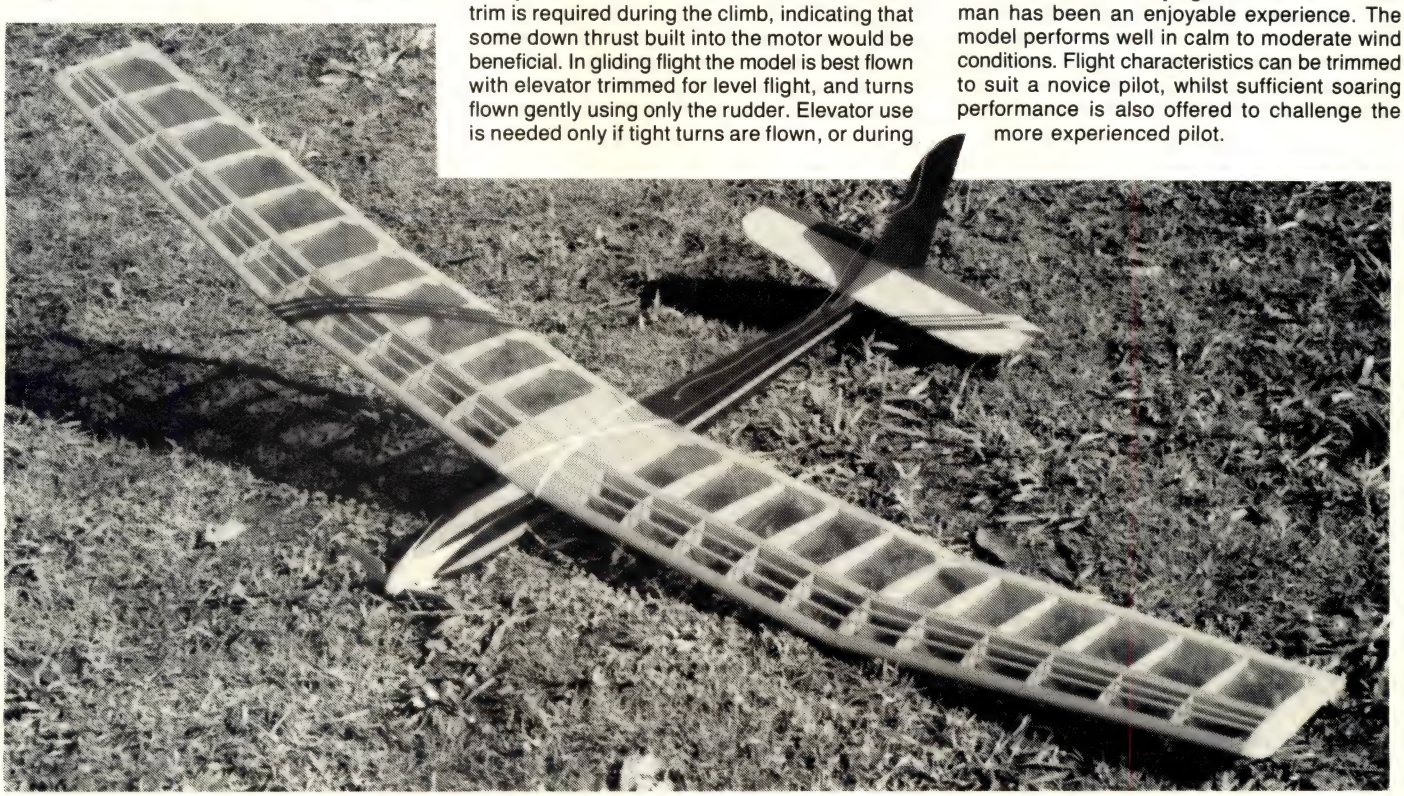
The review model used two Hi-Tec HS 101 mini servos, Futaba 4 channel receiver and Futaba MC 112B speed controller with battery eliminator. To gain additional space in the fuselage, the receiver was tucked into the rear of the fuselage behind the servos.

Power was from a 540 style motor driving a Graupner 8 x 4.5 inch folding propeller.

Flight performance using a standard 540 motor and 8.4 Volt Sanyo 800 AR battery pack is highly satisfactory. Flying weight in this trim is 1080 grams, with no ballast required, as balance was exactly as per plan centre of gravity. In mild wind, two climbs to acceptable height are easily achieved. A moderate amount of down trim is required during the climb, indicating that some down thrust built into the motor would be beneficial. In gliding flight the model is best flown with elevator trimmed for level flight, and turns flown gently using only the rudder. Elevator use is needed only if tight turns are flown, or during landing approaches to control air speed.

Flights with a range of larger capacity battery packs and hotter motors have also been made. Significantly better climb rates are possible with hotter motors. Larger capacity battery packs have given longer motor runs, though the 100 grams extra weight tends to degrade glide performance in calm conditions. Overall, best flights have been on the smaller battery pack.

Construction and flying of the Electro Freshman has been an enjoyable experience. The model performs well in calm to moderate wind conditions. Flight characteristics can be trimmed to suit a novice pilot, whilst sufficient soaring performance is also offered to challenge the more experienced pilot.



MARINE SCENE from Russ Tillyard QUEENSLAND STATE TITLES June 8 & 9, 1991

One week before the Queensland Titles the use of the water at Lawnton was cancelled due to heavy rains during the previous week. The venue was changed, with AMPBA sanction, to Males Dam, situated just north of Brisbane. The event was hosted by the Moreton Bay Offshore Model Boat Club.

As usual, the wind started to blow as the ½km oval racing was about to start. Thirty two boats had entered the time-speed event. Due to the choppy conditions, records seemed to be a pie in the sky but, due to some excellent driving by some competitors, 3 new records were achieved. Erich Arlitsch from Newcastle increased the 15 cc Hydro record to 70.02 kph for the ½km event, with a time of 25.705 seconds. Denis Beresford increased the speed of the 7.5 cc Mono to a new record of 56.01 kph with a time of 32.055 seconds with his new Youngblood 40 inch Mono. I can't wait to see what his 45 Picco will do on smooth water. Greg Carter increased the 7.5 cc Tunnel record to 59.42 kph with a time of 30.29 seconds.

Sunday started without a breath of wind. This could not last - but it did - all day, like a table top, for oval racing, which comprised 24 races, with all classes of hull racing. The 7.5 cc Hydro and the 7.5 cc Tunnel were the most hotly contested events. The winners in these events were S. Ritchie and G. Carter, respectively. The 15 cc Hydro class provided some spectacular racing, with G. Lillis of Newcastle winning the event.

After the racing was finished trophies were presented and the QI was announced. This went to Rod Smith of the Gold Coast Club. Our thanks to the interstate visitors who made the effort to come and provide some excellent racing.

CLASSIFIEDS

WANTED: Radio Control Guide by Argus Publications, and Guide to Thermal Soaring by George Stringwell, also published by Argus Books. Full cover price offered for new copies. Contact Peter Pine on (067) 72 5971.

FOR SALE: RC low wing trainer plane, 56 inch wing span, functioning ailerons and nosewheel finished in Solarfilm. Complete with OS SR 40 engine with muffler. Sanwa Excellence 6 channel radio with 4 servos, rechargeables, charger and some fuel. All brand new, never flown. Selling due to family commitments. $700 or best offer. Phone Russell on (050) 32 9630 [AH].

FOR SALE: Unwanted gift from the UK; Vega 61 Sidevalve 4-stroke glo engine. Ideal for that big biplane or old timer. Factory run only. $350 plus $10 postage. British engineering at its best. Contact A. Trott, 15 Soldier Road, Kojonup, WA, 6395; Ph (098) 31 1508.

FOR SALE: Scale kits, plans abd accessories as new. Corsair Topflite 60 size with cockpit interior, span 61 inch, scale prop nut, $195; Stearman (Sterling) US WW2 trainer biplane 60 size, span 64.5 inch, 3 views, $180; Twin Commanche (Jack Stafford) suit 2 x 40 four-strokes or 2 x 25 two-strokes, span 72 inch, $199; De Havilland Chipmunk (Denis Bryant) 60 size with fibreglass cowl, canopy and plans, span 69 inch, $45; Mustang P51-D (Fliteglas) fibreglass fuselage, cowl, foam cores, plans, 60 size, span 60 inch, $45; AT6 Harvard (Brian Taylor) foam cores, fibreglass cowl, canopy, scale prop nut, plans, 60 size, span 68 inch, $50; FW190 (Brian Taylor) fibreglass fuselage, ex Bob Holman, cowl, canopy, cockpit interior, spinner, plans, 60 size, $125; Lockheed Sirius (Bridi) fibreglass fuselage, foam cores, cowl, hardwood bits, plan, 60 size, 3 views, span 64 inch, instructions, $85; Sachs Dolmar 85 cc two-stroke petrol engine, suit large ¼ scale model, $400. Ring Ian MacPherson on (03) 895 1600 [BH] or (03) 879 0118 [AH].

WANTED: Webra 40 four-stroke, belt drive/drum valve. Contact Derek Pickard on (03) 889 1149.

FOR SALE OR SWAP: Rare aircraft kits including Frog Southern Cross, Shark SB2 and Tamiya 1/48 Brewster Buffalo. Also many books, model magazine back issues and Aircraft Profiles. Phone for Disposal List on (059) 62 3754 (Victoria).

FOR SALE: Hirobo 88 Helicopter with OS 61 long stroke and pump. Futaba 7 channel gold series Radio. All as new condition. Hirobo DDF-SST., Jet ranger. Built up with OS 61 rear cone start. futaba tri-seven radio never flown. All as new condition with 888 Spares and other parts. $7500 worth will sell for $5000 ONO. Phone: (071) 52 0196 (AH).

TO SWAP: OPS 61 ABC Marine with pipe (new in box). Swap for OS 90 or 91 four-stroke RC plane motor. Phone Bruce Astill on (068) 82 4999 [AH] or write to P O Box 587, Dubbo, 2830.

WANTED: Plan of Pilot kit Tiger Moth. Please contact the Editor on (057) 67 2322 to negotiate a deal.

WANTED: New or as new OS 40 VF. Contact Brian Eather, 9 Medley Avenue, Liverpool, 2170. Phone [AH] (02) 602 4934.

WANTED TO BUY: Kyosho Cessna Ag Wagon 188 kit. Contact Geoff Metcalf on (096) 81 1028 with price.

WANTED: Keen aeromodeller wants to obtain back issues of AeroModeller, November '88, October '89, April '67 and May '67. Darryl Duffy, 24 Kerr Street, North Rockhampton, Qld., 4701.

WANTED: Kraft Radio control 7 channel. Reply P.O. Box 1234 Frankston Vic 3199 or Phone: (03) 785 2589 all hours.

FOR SALE: ANCO Retracts 1/3 scale Approx. Fit 5½ to 6" wheels. For P-51 P-47 and PT-19. $400.00. (056) 29 2801 Ask for Earl.

FOR SALE: Bud Nosen Mustang P51D, 102 inch span, flaps and retracts, spun alloy and fibreglass spinner, never flown. I have a 50cc engine not fitted but will sell with plane; $900.00 (051) 27 6767 ask for Rod.

FOR SALE: ENGINES - CMB 60 RC RE ABC, Rear slide carb with in-flight mixture control, silenced tuned pipe with manifold, new in box, $240; ROSSI 90 RC RE RINGED, Rear carb with in-flight mixture control, silenced tuned pipe with manifold, new in box, $385; O.S. .40 FSR R/C, new in box, $120; O.S. .25 FSR T/C, new in box, $95; O.S. .15 R/C, new in box, $50; HP 40 R-PR, bench run only, $150; SUPER TIGRE G.20/.23 R/X, bench run only, $130; SUPER TIGRE G/21/46 R/C, bench run only, mint in box, BEST OFFER!
MARINE ENGINES: ROSSI 65 ABC, with tuned pipe & manifold, new in box, $370; O.S. .40 SR, new in box, $180; O.S. .21 FSR, new in box, $140; O.S. .20, new in box, $80; O.S. .10 FSR, new in box, $85; ROSSI 15, new in box, BEST OFFER. WEBRA Glo-Star 3.5, bench run only, $Z110.
COUGAR Multi-Boat. Winner of 4 Australian 15cc Champi-onships. Complete with Kraft 3 channel Radio, 2 Webra 61 engines & pipes, spare prop's & shafts etc. All is as new condition. $999
IMPALA (Multi) & ASTRAL (Naviga), both with OPS 3.5, less radio, in top condition. $300 each. Phone Neil Johnson, (08) 297 5857. All Hours.

WANTED: Satio FA45 4 Stroke motor. New or Used. Phone: (02) 872 4946.

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SPORT MODELS

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Archie: 1277 mm; Biplane; TD; .35 to .40 engine; 3 or 4 ch. **$11.00**
Auto Gyro: Twin rotor; 675 mm span; TD; .15 to .25 engine; 3 ch. **$8.00**
Baby Buzzard: 1240 mm; high wing; TD; small version of Buzzard Bombshell; for .25 engine and 3 channel radio **$12.00**
Big Wig: 1800 mm; high wing; trike; .61 size, 5 ch; **$26.00**
Blo Fli: 1000 mm; High wing pusher; TD; .049 size; 2 ch **$7.00**
Cessna 172: Semi-scale; 1350 mm; high wing; trike; .30 to .50; 4 ch **$10.00**
Cessna 310: 1180 mm; low wing; trike; for 2 x .15 engines; 4 ch **$14.00**
Cheap Trick: 930 mm; TD; .10 size, 2 or 3 channel **$7.00**
Cheetah: 920 mm; mini pattern model; mid-wing; trike; for 15 to .20 engine and 3 channel radio **$9.00**
Cherokee Babe: Semi-scale; 1350 mm; low wing; trike; for .25 to .40 engine and 4 channel radio **$9.00**
Comet: Sport Delta by Tony Meggs; 1630 mm; .40 engine; 3 or 4 ch. **$15.00**
Crescendo III: 1680 mm; low wing; trike; .61 engine; 4 ch; Tom Prosser winning aerobatic model **$14.00**
Dactyl: 550 mm; flying wing; TD; .29 to .61 engine; 3 ch; with vintage look **$13.00**
Das Cerberus: by Danny Maslowicz. Middle Stik variant; for 3 engines of .25 engine and 3 channel radio **$13.00**
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Das Middle Stik:1140 mm; shoulder wing; trike; for .25 to .30 engine and 4 channel radio **$12.00**
Das Mini Stik: 920 mm; shoulder wing; trike; for .15 to .20 engine and 4 channel radio **$8.00**
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Delta 363: 1240 mm; Delta wing; trike; .35 to .40 engine, 3 ch **$16.00**
Dicky Birdy: 1440 mm; low wing; trike; .40 engine; aerobatic; smaller version of Dirty Birdy **$12.00**
Dirty Birdy: 1640 mm; low wing; trike; .60 size engine; aerobatic. **$17.00**
Double Max: 1520 mm; shoulder wing; trike; 2 x .19 engines, 4 ch **$22.00**
Divider Mk 1: 1060 mm; low wing; trike; .19 to .25 engine; 4 ch **$8.00**
Divider Mk 2: 1060 mm; low wing; TD; .19 to .25 engine; 4 ch **$8.00**
Doubloon: (2 sheets) by Bob Cozens. 1500 mm span; for 2 x .15 to .21 engines and 4 channel radio **$17.00**
Fancy: by Merv Buckmaster. 1700 mm span; V tail; for .29 to .49 engine and 4 channel radio **$14.00**
Fiesta: 1750 mm; low wing; TD; .45 to .50 engine, 4 ch; open cockpit; scale-like; aerobatic **$22.00**
Force 10: 1070 mm; shoulder wing; TD; 1.5 to 2.5 cc; 4 ch; aerobatic. . **$10.00**
Frog Jackdaw: 60 inch; high wing; TD or trike;35 to 40 engine; 4 ch. . **$13.00**
Fun Tiger: 1370 mm; low wing; trike; .35 to .40 engine; 4 ch; aerobatic **$12.00**
Fun-3: 1220 mm; low wing; trike; .40 engine, 4 ch **$14.00**
Gatsby: by Alan Lehmann. Biplane; span 1 metre; for .15 to .21 engine and 3 channel radio **$13.00**
Gere Sport: 915 mm; Biplane; TD; .15 to .25 engine; 4 ch **$12.00**
Guppy: 1340 mm; high wing; TD; .30 to .35 engine; 3 ch **$16.00**
Hanriot Du Pont: 1820 mm; Biplane; .61 size; 4 channels; scale-like, slow stable flyer **$26.00**
Honker Bipe: 920 mm; Biplane; TD; .09 to .25 engine; 3 or 4 ch **$8.00**
Hotch Potch: 920 mm; high wing; .10 to .15 engine; 4 ch; hand launch **$15.00**
Jumbo: 1640 mm; high wing; 385 mm chord; TD; .61 engine; 3 ch ... **$25.00**
Kavellier 20: Shoulder wing; trike; wash-out wing; for .19 to .25 engine and 4 channel radio **$9.00**
Little Gem; by Paul Lagan. Early QM design, 1 metre span, for .15 engines **$12.00**
MCA: by Vin Masters. 1600 mm span; .29 to .49 engine; 4 ch; **$14.00**
Maricardo:; 1142 mm; mid wing; TD; .35 to .40 engine, 4 channel radio; Looks like a racer, flys like a trainer **$12.00**
Miss Keeto: Cabin model; 1420 mm; low wing, bi-convex aerofoil; trike or TD; for .19 to .40 engine; 3 functions **$8.00**
Mite: 940 mm; low wing; TD; 2 x .15 to .19 engines, 4 ch **$10.00**
Mongster Bipe: Biplane; 725 mm span; .15 engine; 4 channel radio ... **$12.00**
Moonglow VI: 1520 mm; low wing; trike; .61 size; 4 ch; aerobatic **$13.00**
Moon Probe: 1065 mm; low wing; trike; .19 to .23 engine; 4 ch; **$10.00**
New Era 3: 1120 mm; mni-pattern; low wing; trike; .19 to .30; 4 ch; **$12.00**
Omen: by Peter Kraus. 1520 mm; .20 to .30 engines; 3 ch; **$10.00**
Painted Lady; 1370 mm; Biplane; TD; .45 to .61 engine, 4 ch; **$24.00**
Parakeet: by Russ Hammond. 1300 mm; .15 engine; 3 ch; radio **$12.00**
Partenavia Victor P68: 2000 mm; high wing; trike; 2 x .19 engines, 4 or 5 ch; slow flying; optional flaps **$25.00**
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Pelago:; 1610 mm; low wing; TD; .49 to .61 engine, 4 channels; sporty cabin style **$13.00**
Pushover: 935 mm; High wing; .049 - .79 diesel; light weight pusher. **$9.00**
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Roulet II: 1370 mm; parasol wing; TD; .19 to .40 engine; 3 ch; **$11.00**
Sandpiper: 1370 or 1800 mm; shoulder wing; trike; .60 engine, 4 channels; aerobatic **$13.00**
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Sky Chief: 1320 mm; low wing; TD; .29 to .40 engine; 4 ch; **$11.00**
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Snappy Mills: by Don Howie: 940 mm span; high wing; TD; .061 engine; 2 or 3 ch . **$7.00**
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Stingray: by Alan Lehmann: Delta wing; 813 mm span; for .09 to .18 engine and 3 channel radio **$10.00**
Strike Master: Jet fighter lines; 1365 mm span; high wing; trike; for .40 engine and 4 channel radio **$14.00**
Stringalong: 1900 mm; Biplane; TD; .49 to .60 engine, 4 ch; slow flyer **$22.00**
Swee' Pea: 1160 mm; high wing; TD; .19 to .25 engine, 3 channels; small aerobatic cabin model **$9.00**
Swiftee Too: 1220 mm; low or shoulder foam wing; TD; .40 engine and 4 channel radio **$12.00**
Tarqueen: by Merv Buckmaster; Powered soarer; 2310 mm span; for .09 to .25 engine and 2 or 3 channel radio **$11.00**
Tranquiliser: 1520 mm; parasol wing; TD; .40 engine, 3 or 4 ch; **$11.00**
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Wayfarer: 1370 mm; Biplane; .40 to .60 engine; 4 ch; **$16.00**
Winter Special: by Bill Winter and Bill Kaluf. 1983 version of 1947 design; for .40 4-stroke engine; 5 controls **$21.00**
Wot Knot: 1168 mm; shoulder wing; TD; .19 to .40 engine; 4 ch; **$12.00**
Yoko: 1730 mm; low wing; TD .60 engine, 4 channels, aerobatic; radial cowl; sheeted wing **$13.00**
Zonda: 1270 mm; shoulder wing; TD; .29 to .40 engine; 4 channels; aerobatic cabin model **$11.00**
½A Quanger: 1828 mm; shoulder wing; 1 cc engine; powered soarer by M. Buckmaster **$13.00**

TRAINER AIRCRAFT

Basica Trainer: 1260 mm; high wing; TD; .15 engine; 4 ch; **$9.00**
Blo Fli: 1000 mm; high wing pusher; trike; .049 size, 2 ch; **$7.00**
Cheap Trick: 930 mm; TD; .10 size, 2 or 3 ch; **$7.00**
Flying Flivver: 1130 mm; Biplane; TD: aerobatic lines of 1930s home-built; for .40 engine; 4 functions **$12.00**
Frog Jackdaw: 60 inch; high wing; TD or trike; 35 to 40 engine; 4 ch. **$13.00**
F 400: 1500 mm; high wing; trike; .40 to .50 engine; 4 ch; **$12.00**
Furfy Trainer: 1380 mm; for .19 to .40 engine and 4 channel radio **$12.00**
Gatsby: by Alan Lehmann. Sport bi-plane; span 1 metre, for .15 to .21 engine and 3 channel radio **$13.00**
Hot Drop 2: 1320 mm; high wing; TD; ideal first model; for .15 to .25 engine; 3 functions **$13.00**
MCA: by Vin Masters; 1600 mm; .29 to .49 engine; 4 ch; **$14.00**
Maricardo: 1142 mm; mid wing; TD; .35 to .40 engine; 4 ch; looks like a racer, flys like a trainer **$12.00**
MiniDrake: by Celestino Rossi. 1600 mm span pusher; for .049 engine and 2 channel radio **$12.00**
Miss Muffet: by Paul Lagan. Aerobatic trainer; span 1300 mm; for .25 to .40 engine; 3 or 4 channel radio **$12.00**
Parakeet: by Russ Hammond; 1300 mm; .15 engine; 2 or 3 ch; **$12.00**
P-Ship: by Merv Buckmaster; 3-piece wing for choice of 1200 or 1800 mm span; for .15 to .29 engine and 3 channel radio **$13.00**
RG 5: 1520 mm; shoulder wing; TD; .35 engine, 4 channels, symmetrical wing section, upright engine **$24.00**
Roulet II; 1370 mm; parasol wing; TD; .19 to .40 engine; 3 ch; **$11.00**
Sandpiper: 1370 or 1800 mm; trike; shoulder wing, .60 size, 4 ch; **$13.00**
Snappy Mills: 930 mm; high wing; TD; .10 size, 2 or 3 ch; **$7.00**
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Ascender: Thermal; 2180 mm; high wing **$11.00**
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A-Tail: Slope; by Mike Combe. 1240 mm span **$7.00**
Bolas: Slope; 1830 mm; shoulder wing; 3 ch. **$10.00**
Cherub D: Slope; 3074 mm; shoulder wing; 2 ch; **$15.00**
Condor: Thermal; by Dario Mestrovic. 2 metre span **$12.00**
Crystal 3: Thermal; 3750 mm; 3 ch; with spoilers **$20.00**
Drifter: Thermal; 3040 mm; high wing; 2 ch. **$14.00**
Glydalec: Thermal; by Terry Seabrook. 1800 mm span;
2 different wing designs **$12.00**
Frog Prince: Thermal; 60 inch; 2 ch **$10.00**
Golden Eagle: Slope; 1600 mm; high wing; 2 ch;
fuselage and wing shape of eagle **$10.00**
Gus: Thermal; 1804 mm; shoulder wing; 2 ch. **$8.00**
Halcyon: Thermal; 2820 mm; shoulder wing; 2 ch; for light winds **$14.00**
Hatchet: Thermal; 2466 mm; shoulder wing; 2 ch. plus auxilliary **$14.00**
Hot Pants: Slope; 1520 mm; middle wing; 3 ch; fast and aerobatic **$11.00**
Inglefinger: Thermal; by Paul Lagan. 2500 mm span;
simple 2 function floater **$13.00**
Javelin: Thermal; by Dario Mestrovic. 2 metre span; (2 sheets) **$15.00**
Kema-73: Slope; 1680 mm; high wing; 3 ch; aerobatic **$11.00**
Little Plank: Slope; 1420 mm; high wing; with elevons;
2 functions; can fit pusher motor **$10.00**
Martinet: Thermal, by Martin Simons; 2 metre span; low aspect ratio; .. **$17.00**
Monterey: Thermal; 2525 mm; high wing; 2 functions **$10.00**
Pedro: Slope; 1250 mm; high wing; 3 ch; good first aerobatic model .. **$13.00**
Phase Four: Slope; 1700 mm; shoulder wing; with ailerons; 3 functions **$10.00**
Phase One: Slope; 1830 mm; high wing; T-tail; 3 functions **$10.00**
Pippita: Thermal; 2280 mm; shoulder wing; 2 channel radio **$12.00**
Probe: Slope; 1520 mm; high wing; 2 or 3 ch; V-tail **$9.00**
Rex 1A: Thermal; 2840 mm; high wing; 2 ch; **$13.00**
Ridge Runner II: Slope; 1820 mm; low wing; ailerons; elevators; 2 ch; .. **$10.00**
Riser: Unusual slope soarer, by Hugh Patrick; 2800 mm;
coupled flaperons and V tail; **$16.00**
Slingsby Capstan: Slope; 2095 mm; high wing; 2 ch; near scale **$12.00**
Slingsby T31: Slope; 2064 mm; parasol wing; 4 ch; 2-piece wing **$11.00**
Slope Swallow: Slope; 1830 or 2750 mm; high wing; 2 ch; trainer **$11.00**
Soarcerer: Slope; 1320 mm; high wing; 2 ch; good first model **$10.00**
Soar-cy II: Slope; 1300 mm; high wing; 2 or 3 ch; aileron trainer **$9.00**
Standard Martini: Thermal, by Martin Simons; 2500 mm;
with aerodynamic pedigree **$13.00**
Sunkist: Hand Launch; by John Tilley. 1340 mm span **$8.00**
Supa Kema 69: Slope; 1850 mm; high wing; 3 ch; T-tail **$12.00**
Suzy Scoot: Slope; 1420 mm; shoulder wing; 4 ch;
with flaperons; highly aerobatic **$10.00**
Swallow: Slope, Thermal or Hand Launch; by Garth Davies and Zoltan Enoch.
1500 mm span; sleek V-tail glider **$12.00**
Thermal Queen: Thermal; 2525 mm; high wing; 2 channels **$12.00**
Tri Tri: Thermal; 2520 mm; high wing; 2 ch **$12.00**
Unique Monique: Slope; 1830 mm; high wing; 2 ch; quick to build **$10.00**
Vixen: Slope; 1600 mm; high wing; 2 ch; V-tail **$10.00**
Voo Doo: Slope; 1750 mm; middle wing; 2 ch; flying wing **$10.00**
V-2: Slope; 1780 mm; shoulder wing; 2 ch; V-tail **$11.00**
Windfree: Thermal; 2526 mm; high wing; 2 channels **$14.00**
Windsong: Thermal; by Bruce Abell. 2 metre span;
refined contest sailplane **$13.00**
Windsprite: Slope; by Bruce Abell **$9.00**

POWERED SOARERS

Alpavia: Fournier scale; 1625 mm; low wing; TD;
for .049 to .9 engine and 1, 2 or 3 channel radio **$8.00**
Bravo: 1470 mm; high wing; .09 or .15 diesel engine; 2 ch;
multi purpose trainer and slope soarer; ailerons and elevator **$10.00**
Quanger: by Merv Buckmaster. 2400 mm span;
for .15 to .40 engine and 3 channel radio **$16.00**
½A Quanger: by Merv Buckmaster. 1828 mm; span;
for engine up to 1 cc; 2 channels **$13.00**
Sky Shark: by Bob Moye. 2000 mm span; 1.5 cc engine; 2 channels .. **$10.00**
Tarqueen: by Merv Buckmaster. 2310 mm span
for .09 to .25 engine and 2 or 3 channel radio **$11.00**

ELECTRIC POWERED GLIDERS

Glydalec: by Terry Seabrook. 1800 mm; 2 different wing designs **$13.00**
Heron: by Bill Winter. 1640 mm **$10.00**
Urchin: by Wayne Hadkins. For 6 or 7 cells and .05 motor **$9.00**
Whisper: by Vin Masters. 2100 metre span; for 2 channel radio **$13.00**
Whisper 3: 1778 mm; for 7 cells **$12.00**

MISCELLANEOUS

Aircraft Floats: For aircraft up to 2 kg **$6.00**
Aircraft Floats: For aircraft up to 3 kg; 915 mm long **$8.00**

CONTROL LINE

Bearcat/Zero: Profile fuselage; 735 mm span; for .15 engine **$8.00**
Bunyip: ½A Speed model by Ivars Dislers **$5.00**
De Bolt Biplane: 700 mm span; for .61 engine **$11.00**
Demon: Combat; 890 mm span; for .29 engine **$8.00**
Firecracker: by Brian Eather. Super stunter; 1500 mm span; .49 engine **$17.00**
Fokker Dr1: Tri-plane stunter; 800 mm span; for .19 to .25 engine **$8.00**
Formula S: Stunter; 1420 mm span; for .35 to .40 engine **$12.00**
Mike Argander Special: 1/8 scale Mini Goodyear Racer; for .09 diesel . **$10.00**
Mini Bandolero: Profile stunter, by Frank Coombs;
for .15 engine; (2 sheets) **$13.00**
Mini Nobler: Profile stunter, by Frank Coombs; .15 engine; (2 sheets) .. **$13.00**
Mongoose: 2 cc Speed model by Ivars Dislers **$5.00**
Mustang P 51: 1200 mm span; for .09 to .25 engine;
also suit conversion to RC **$16.00**
Olympus: Profile stunter, by Frank Coombs; for .15 engine; (2 sheets) . **$13.00**
Piranha: by Maris Dislers. For ½A Combat. Simple & tough **$10.00**
Rossi Sidewinder: F2A, by Robin Hiern; for .15 engine **$13.00**
Sam: Trainer by Esterco Barsic. 500 mm span; for .049 engine **$9.00**
Spud: by Maris Dislers. Combat; for .15 engine **$11.00**
Sundance: Stunter; 1370 mm span; for .35 engine **$10.00**
Tearalong: Combat; 890 mm span; for .15 engine **$8.00**
Tissue Trim: by Frank Coombs. Simple racer; for .09 to .29 engine **$11.00**
Trinity Trainer: by David Bevan. 600 mm span for .15 engine **$7.00**
U-Control Trainer: from Hobbies Illustrated 1948 ..... **$8.00**
Warhawk P40: Semi scale with flaps; 1420 mm; for .35 to .40 engine .. **$10.00**
Winder: Combat; 1065 mm span; for .19 engine **$14.00**

FROG SERIES

Frog Aerobat: CL stunter; for .15 engine **$10.00**
Frog Attacker: CL Stunter; 1270 mm span **$11.00**
Frog Cirrus: FF rubber; 965 mm span **$10.00**
Frog Diana: FF glider; 915 mm span **$9.00**
Frog Firefly: FF power; biplane **$7.00**
Frog Fox: FF power; 40 inch span; 1.5 cc diesel; pylon **$8.00**
Frog 45: FF power; semi-scale; 1145 mm span **$10.00**
Frog Goblin: FF hi-wing rubber; 610 mm span **$8.00**
Frog Jackdaw: RC; 60 inch span; 35 to 40 engine; 4 ch **$13.00**
Frog Janus: FF power; 1145 mm span; .09 diesel **$9.00**
Frog Jupiter: FF rubber; 930 mm span; **$7.00**
Frog Mamba: FF rubber; swept wing; 480 mm span **$8.00**
Frog Minx: FF rubber; 762 mm span **$7.00**
Frog Mirage: 5cc CL Team Racer (Class B) **$8.00**
Frog Nimrod: FF; semi-scale for .049 engine **$7.00**
Frog Petrel: FF Glider; 33 inch span; **$8.00**
Frog Powavan; FF power; pylon type; for 0.75 engine **$9.00**
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Frog Special Series: 5 rubber plans on 1 sheet **$13.00**
Frog Sprite: FF Rubber; 613 mm span; **$7.00**
Frog Stratosphere & Strato D: FF power;
1065 mm span; for .09 engine **$11.00**
Frog Tarquin: FF power; high swept wing; engine on pylon;
990 mm span; for .09 engine **$11.00**
Frog Tutor: FF power; semi-scale;
1090 mm span; for ,09 engine **$11.00**
Frog Vanda: FF glider; 1010 mm spam **$8.00**
Frog Vanda Mk II: FF glider; 1020 mm span **$8.00**
Frog Vandiver: CL; aerobatic; 685 mm span **$9.00**
Frog Vanfire: CL; 1016 mm span; .30 engine **$12.00**
Frog Vantage: CL; .5 cc Team Racer (Class B) **$9.00**
Frog Ventura: FF glider; 1065 mm span **$8.00**
Frog Venus: FF rubber; 38 inch span **$9.00**
Frog Vespa: FF glider; 762 mm span **$8.00**
Frog Vixen: FF power; 940 mm span; .09 engine **$8.00**
Frog Witch: FF rubber; 915 mm span **$8.00**
Frog Witch II: FF rubber; 36 inch span **$8.00**
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Acro Star: 1270 mm; aerobatic biplane; TD; .40 engine; 4 ch; **$21.00**
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Ansaldo SVA 5: 1300 mm; Biplane; TD; .40 engine; 4 channels;
ailerons on upper wing only **$10.00**
Avro Avian: by Arthur Bugden & John Farmer. 1/4 scale; 2300 mm span;
for 1.2 4-stroke engine; (2 sheets) **$30.00**
BAC Superdrone: by Roy Dray. 1/4 scale; 3 metre span;
for .40 4-stroke engine **$22.00**
Baby Ace: 1650 mm; parasol wing; TD; .40 to .45 engine; 4 ch; radio . **$20.00**
Bebe Jodel D9: 1470 mm;low wing; TD; .29 to .40 engine; 4 ch; **$12.00**
Bristol Bullett: 1200 mm; Biplane; TD; .61 engine; 4 ch; **$14.00**
Chipmunk: 1730 mm; R.A.F. trainer; low wing; TD; fixed u.c.;
for .45 to .61 engine; 4 functions **$22.00**
Citabria: 2600 mm; high wing; TD; Superb first big plane;
for .61 geared engine or .90 Quadra and 4 channel radio **$40.00**
De H Moth Minor: Outlines & details only, drawn by Bill East.
1/6 scale; 1400 mm span **$15.00**
Dewoitine D510: Outlines & details only, drawn by Bill East.
1/8 scale; 1500 mm span **$15.00**
Druine Turbulent: 1640 mm; 1/4 scale; low wing; TD;
for .40 to .60 engine; good intro to scale **$22.00**
Druine Turbulent: by Wayne Fitzgerald. 1/3 scale;
for 1.2 two-stroke; (2 sheets) **$30.00**
Edgar Percival EP9: 1788 mm; high wing; TD; .61 engine;
4 or 5 channels; near- scale crop duster with working hopper **$22.00**
Fairchild 24: by Ian Carter. 1/6 scale; 1800 mm span;
for .40 4-stroke engine; (2 sheets) **$22.00**
Cowl available from the designer)
Fairey Flycatcher: 1470 mm; Biplane; TD; .61 engine, 4 channels, ... **$30.00**
Fairey Junior: by John Mauchline. 1/3 scale; 2.3 metre span;
for 1.2 four-stroke (2 sheets) **$33.00**
Fleet Biplane: Semi-scale biplane; simple construction; 1249 mm; TD;
for .40 engine and 4 channel radio **$14.00**
Flut-R-Bug: by Glynn Withey. 1/4 scale; 1930 mm span;
for .40 2-stroke or 10 cc 4-stroke engine; (2 sheets) **$21.00**
Fly Baby: by Jim Brennan. 1/4 scale; 2100 mm span;
for .90 4-stroke engine; (2 sheets) **$21.00**
Fly Baby: 1310 mm; low wing; TD; .10 to .15 engine; 4 channels;
semi-scale fun model by G. Whitehead **$10.00**
Fokker D VII: 1510 mm; Biplane; TD; .49 to .60 engine; 4 ch; **$26.00**
FMA Pucara: by Hans Heck. 1/9 scale; 1600 mm span;
for 2 x .25 engines; (2 sheets) **$21.00**
FW 190: Semi-scale; 1300 mm span; TD; .40 engine; 4 channels **$13.00**
Gypsy Moth: 2280 mm; Biplane; TD;
for .61 geared engine or .70 Quadra; 4 channels. **$26.00**
Hawker Fury: 760 mm; Biplane; TD; .09 engine; single channel **$10.00**
Hawker Hurricane: 1270 mm; low wing; TD; .09 to .15 engine,
Single channel, easily modified for 2 channels **$12.00**
Hawker Hurricane: 1730 mm; low wing; TD; .61 engine, 4 ch., ... **$25.00**
Laser 200: by Steve Bode. 2500 mm span; for 1.8 engine; (2 sheets) .. **$30.00**
Lavochkin 5FN: by Pavel Bosak. Stand Off Scale WW2 fighter.
1120 mm span; for .35 engine and 4 channel radio **$9.00**
Lazy Ace: 1800 mm; Biplane; TD; .61 engine; 4 ch; **$32.00**
Messerschmitt 109E: 1550 mm; low wing; TD; .61 engine; 4 ch; **$26.00**
Morane 'N': 1420 mm; mid wing; TD; .29 to .40 engine; 3 channels;
all flying tail **$13.00**
M.S. Epervier: Outlines & details only, drawn by Bill East.
1/6 scale; 1600 mm span **$13.00**
Mustang P 51: 1200 mm; low wing; TD; .09 to .25 engine; 3 or 4 ch; .. **$11.00**
Mustang P 51: 1600 mm; low wing; TD; .61 engine; 4 channels **$22.00**
Percival Gull: 1830 mm; low wing; TD; .61 engine; 4 ch; **$26.00**
Percival Provost: 1520 mm; low wing; TD; .61 engine; 5 ch;
highly detailed; fixed undercarriage; flaps **$26.00**
Piper Cub: 1800 mm; high wing; TD; .29 to .35 engine; 4 ch;
suit first attempt at scale **$22.00**
Pitts Special: 1120 mm; Biplane; TD; .61 engine; 4 ch; **$20.00**
Pitts Special: 1320 mm; Biplane; TD; .61 engine; 4 ch;
aerobatic; high performer **$21.00**
S.E 5A: 1370 mm; Biplane; TD; lots of detail; .61 engine; 4 ch; **$25.00**
Spinks Acromaster: 1900 mm; TD; .61 geared or .90 Quadra; 4 ch; ... **$26.00**
Spitfire Mk IX: 1644 mm; low wing; TD; .61 engine; 4 ch; **$26.00**
Super Fli: 1530 mm; low wing; TD; .45 engine; 4 channel radio **$20.00**
Taylorcraft: 1830 mm; high wing; TD; American light plane;
for .45 to .61 engine; 4 channels **$28.00**
Tiger Moth 40: 1270 mm; Biplane; TD; .40 engine; 4 channel radio ... **$22.00**
Tiger Moth 61: 1450 mm; Biplane; TD; .61 engine; 4 channel radio ... **$25.00**
Tony (Kawasaki Hien): WW2 fighter; low wing; TD; .60 size; 4 or 5 ch; **$20.00**
Volksplane: 1460 mm; low wing; TD; full flying tail; .45 engine; 4 ch; .. **$12.00**
Waco E: 1200 mm; Biplane; TD; .61 engine; 4 ch; **$22.00**
Westland Whirlwind: 1650 mm; low wing; TD; .30 to .40 engine; 4 ch., **$20.00**

PYLON RACERS

Cassutt Special: QM; 949 mm; shoulder wing; TD;
.15 engine; 2 to 4 channels; **$8.00**
Cobra: QM; 1070 mm; semi-scale; low wing; trike; .15 engine; 2 to 4 ch; **$8.00**
De Bolt Special (FAI): 1240 mm; low wing; TD; .40 engine; 2 to 4 ch; **$12.00**
Denight Special: QM; 1070 mm; low wing; TD; .15 engine; 2 to 4 ch; .. **$9.00**
El Bandito: QM; 915 mm; shoulder wing; TD; .15 engine; 2 to 4 ch; **$8.00**
Hue-N-Cry: Formula S; by John Hughan **$12.00**
Little Gem: by Paul Lagan. Early QM design. Span 1 metre;
for .15 engine; 2 to 4 channel radio **$12.00**
Little Mike: 1170 mm; shoulder wing; TD; .40 engine; 4 ch; **$10.00**
Little Toni: FAI; 1270 mm; low wing; TD; light weight;
for .35 engine; 2 to 4 channel radio **$12.00**
Miss Cosmic Wind: QM; 890 mm; shoulder wing; TD;
.15 engine; 2 to 4 channel radio **$8.00**
Miss Muffett: by Paul Lagan. Formula S; 1300 mm span;
for .25 to .40 engine; 3 or 4 channel radio **$12.00**
Ole Tiger:; ½A; 790 mm; mid wing; TD; .049 to .051 engine; 2 ch; **$7.00**
P. 51 Mustang: FAI; 1450 mm; low wing; TD; .40 engine; 2 to 4 ch; ... **$16.00**
Photon: by Danny Maslowicz. QM; 1200 mm; .15 engine; 2 to 4 ch; ... **$12.00**
Rivets: FAI; 1220 mm; low wing; TD; .40 engine; 4 ch; **$13.00**
Shoe String: QM; 1015 mm; shoulder wing; TD; 4 ch; **$9.00**
Teara: by Max Kroone. Formula S; 1200 mm; .40 engine; 3 ch; **$14.00**
3 in 1: Shoe String, Dick Ohm, Ole Tiger; QM; 1020 mm
shoulder wing; TD; .19 engine; 2 to 4 channel radio **$8.00**

R.C. PATTERN

Atlas: 1660 mm; low wing; trike; .61 engine; 4 ch; **$17.00**
Curare 40: 1420 mm; low wing; trike; .40 engine; 4 or 5 ch; **$14.00**
Curare 61: 1640 mm; low wing; trike; .61 engine and 4 or 5 ch; **$16.00**
Dicky Bird: 1420 mm; low wing; trike; .60 engine; 4 ch; **$17.00**
Eagle: by Tom Prosser; 1900 mm;
10 cc gear drive or 1.2 4-stroke engine **$20.00**
Spectre: 1650 mm; low wing; trike; .61 engine; 5 ch; flaps **$14.00**
U.F.O.: 1650 mm; low wing; trike; .61 engine; 4 or 5 ch; **$20.00**

R.C. OLD TIMER & VINTAGE

Big A-Box: by Charles Barron, 1941. Enlarged to 84 inch (2130 mm) span;
for .29 to .61 engine and 3 channel radio **$16.00**
Buzzard Bombshell: 1830 mm; high wing; TD;
.29 to .49 engine and 3 channel radio **$20.00**
Debbie: by Nick Limber, 1939. 1900 mm span **$14.00**
Finneran Flyer: by Jack Finneran, 1935. 2300 mm span;
for 40 4-stroke or 10 cc spark ignition engine **$15.00**
Frog Jackdaw: 1942. 1500 mm span **$14.00**
Fury: by Carl Hermes, 1950. 1600 mm span;
for .15 to .40 engine (2 sheets) **$14.00**
Krupp's 1937 Bowden Contest Winner: 2400 mm span;
for .30 to .49 2-strokes or .49 to .61 4-strokes; (2 sheets) **$21.00**
Long Cabin (½ Size); 1380 mm span **$11.00**
Rambler: by Gil Shurman, 1939. 2400 mm span
(enlarged for Texaco); for .35 to .61 4-strokes (2 sheets) **$22.00**
Torpedo: by Les Adams, 1937. 2 metre span **$14.00**
Winter Special: by Bill Winter & Bill Kaluf. 1983 version of 1947 RC design;
for .40 4-stroke engine; 5 controls **$21.00**

HALF A OLD TIMER DESIGNS

Anderson's Pylon: 1937; 1130 mm span **$10.00**
Ehling's 1937 Gas Model: 1300 mm span **$11.00**
Lanzo Record Breaker: 1200 mm span **$11.00**
MG: by Mike Granieri. 1300 mm span **$11.00**
PB2: by Thracy Petrides. 1200 mm span **$11.00**
Rambler: by Gilbert Shurman. 1200 mm span **$11.00**
Playboy Cabin: 1300 mm span **$11.00**

BOATS

Bathurst Class Corvette: by Cliff Beazley. 96:1 scale
590 mm; for .05 electric motor; simple plan ... **$6.00**
Day Cruiser: Cruiser; 915 mm;
for .29 to .40 engine and 2 channel radio **$8.00**
Deanna: Cabin cruiser; 635 mm; for .25 engine and 2
channel radio **$9.00**
EZ-Vee: V-Hull Speed boat; 810 mm;
for .29 to .40 engine and 2 channel radio **$8.00**
Hydraglide: Pontoon style airboat; by Tonci Vucak.
for .40 engine **$10.00**
Miss Misty: Hydro; 600 mm;
for .25 engine and 2 channel radio **$8.00**
Pegasus: Flattie; 640 mm; for .29 engine **$9.00**
Thames Walton Air-Sea Rescue Launch:
for electric or i.c. power **$10.00**

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FREE FLIGHT

SCALE (Power)—

Bristol M1C: by Celestino Rossi.
900 mm span; for 1 cc engine **$10.00**
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Piper Pawnee: by John Polett1.
1300 mm span; for 1.5 cc engine **$12.00**
Polish RWD4: by Jim Fullarton.
1040 mm span; for 0.8 cc engine **$12.00**
Taylorcraft Auster 4: by Paul van Leuven.
1 metre span; for 1 cc engine or electric power **$10.00**

SCALE (Glider and Rubber) —

Albatross D5: 450 mm span **$5.00**
Bell Aircobra: 600 mm span **$5.00**
Blackburn Skua: 590 mm span **$5.00**
Bristol Troup Glider: 710 mm span **$5.00**
CAB Minicat: 490 mm **$5.00**
Caudron Cyclone: 570 mm span **$5.00**
Curtiss Ascender: 410 mm span **$5.00**
Curtiss P40 D: 620 mm span **$5.00**
Douglas XB 42: 280 mm span **$5.00**
Fairchild (24) Argus: 750 mm span **$5.00**
Fairchild PT 19: 640 mm span **$5.00**
Fairey Barracuda: 360 mm span **$5.00**
Fiat G50: 680 mm span **$5.00**
General Aircraft Hotspur Glider: 590 mm span **$5.00**
General Aircraft Skyfarer: 740 mm span **$5.00**
Grumman XH4F: 460 mm span **$5.00**
Hawker Hurricane: 560 mm span **$5.00**
Howard GH1: 620 mm span **$5.00**
Interstate Cadet: 770 mm span **$5.00**
Luscombe 10: 590 mm span **$5.00**
Messerschmidt: 530 mm span **$5.00**
Miles Magister: 700 mm span **$5.00**
Miles Masters: 580 mm span **$5.00**
Miles Mohawk: 530 mm span **$5.00**
M.I.G. 3: 570 mm span **$5.00**
N.A. Mustang: 580 mm span **$5.00**
Rearwin Speedster: 700 mm span **$5.00**
Rearwin Speedster 6000: 510 mm span **$5.00**
Schweizer TG2 Glider: 780 mm span **$5.00**
Spitfire: 690 mm span **$5.00**
Spitfire 9: 440 mm span **$5.00**
Stormovik IL2: 740 mm span **$5.00**
Taylorcraft: 820 mm span **$5.00**
Taylorcraft L2B: 620 mm span **$5.00**
Vultee Vanguard: 600 mm span **$5.00**
Waco E: 530 mm span **$5.00**

POWER —

BeCa F1C: by Celestino Rossi. 1600 mm span **$11.00**
Jimmy 2 F1C: by Stuart Sherlock. 1800 mm span **$12.00**
Provincial: 813 mm; 1950 ½A power model by Bernard Marsh **$7.00**

OLD TIMERS & VINTAGE

AK 42: by Alan King, 1950.
42 inch span (1067 mm); for .12 engine **$11.00**
AK 48: by Alan King, 1948.
48 inch span (1200 mm); for 2 cc engine **$11.00**
B.B.: by Alex Barter and Bob Howie.
1580 mm span **$10.00**
Bikini: 1946 French model; 1520 mm; 1.5 cc . **$10.00**
Bunch Cadet Major: 1935.
800 mm span; for rubber power **$10.00**
Crowbar: 1210 mm; for 2.5 cc; by Basil Healy **$10.00**
Duplex: by Chet Lanzo, 1937.
1100 mm span; for rubber power **$11.00**
Eastern States Gas Champ: by Russell Simmons, 1940.
1 metre span; for 0.8 cc engine **$10.00**
Floater: by Jim Fullarton, 1939.
1 metre span; for rubber power **$10.00**
Fly Baby Cabin: by Pete Bowers, 1946.
1200 mm span; for 1.5 cc engine;
2 sheets with float plans included **$13.00**
Flying Midget: by Thracy Petrides, 1937.
1200 mm span; for 1.5 to 2.5 cc engine **$11.00**
Flying Pencil Junior: by Alan King, 1952.
1300 mm span; for 2.5 cc engine **$12.00**
French's Rubber Model: 1940. 800 mm span **$10.00**
Gnat: by Claude McCullough, 1941.
1 metre span; for 2.5 to 5 cc engine **$11.00**
Golden Boomerang: 1118 mm; 1946 power model; for 2.5 cc; by Adrian Bryant **$7.00**
Gregory's State Champ: 1949.
1300 mm span; for 2 cc engine **$11.00**
Hi Climber: by Earl Stahl, 1939.
800 mm span; for rubber power **$9.00**
Ibis: by Tim Hervey, 1934.
1 metre span; for rubber power **$11.00**
Keycraft Firefly: Cabin style; 600 mm span; for rubber power **$10.00**
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Megow Kadet: by Phil Karnow, 1939
1308 mm span **$9.00**
Parachute Plane: 1 metre span; for rubber power **$11.00**
Pinnuto: by F. Conte, 1943.
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Red Zephyr: by Scientific, 1940.
1800 mm span; for 5 to 10 cc engine **$15.00**
Renning's Class C Stick Trainer: 890 mm span; for rubber power **$7.00**
Simplex: by Paul Plican, 1941.
1500 mm span; for 1.5 to 5 cc engine **$11.00**
Torpedo: by Les Adams, 1937.
2 metre span; for 2.5 to 6.5 cc engine **$13.00**
Women's Weekly Cabin Monoplane: 1935.
900 mm span; for rubber power **$11.00**
See also Frog Series on previous page.

RUBBER —

Felstead's F1D: Microfilm design by Boyd Felstead.
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Hexagon Classic P30: by Celestino Rossi.
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Tumbleweed Coupe d'Hiver: by John Lewis.
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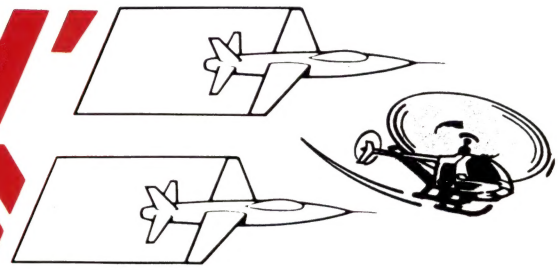

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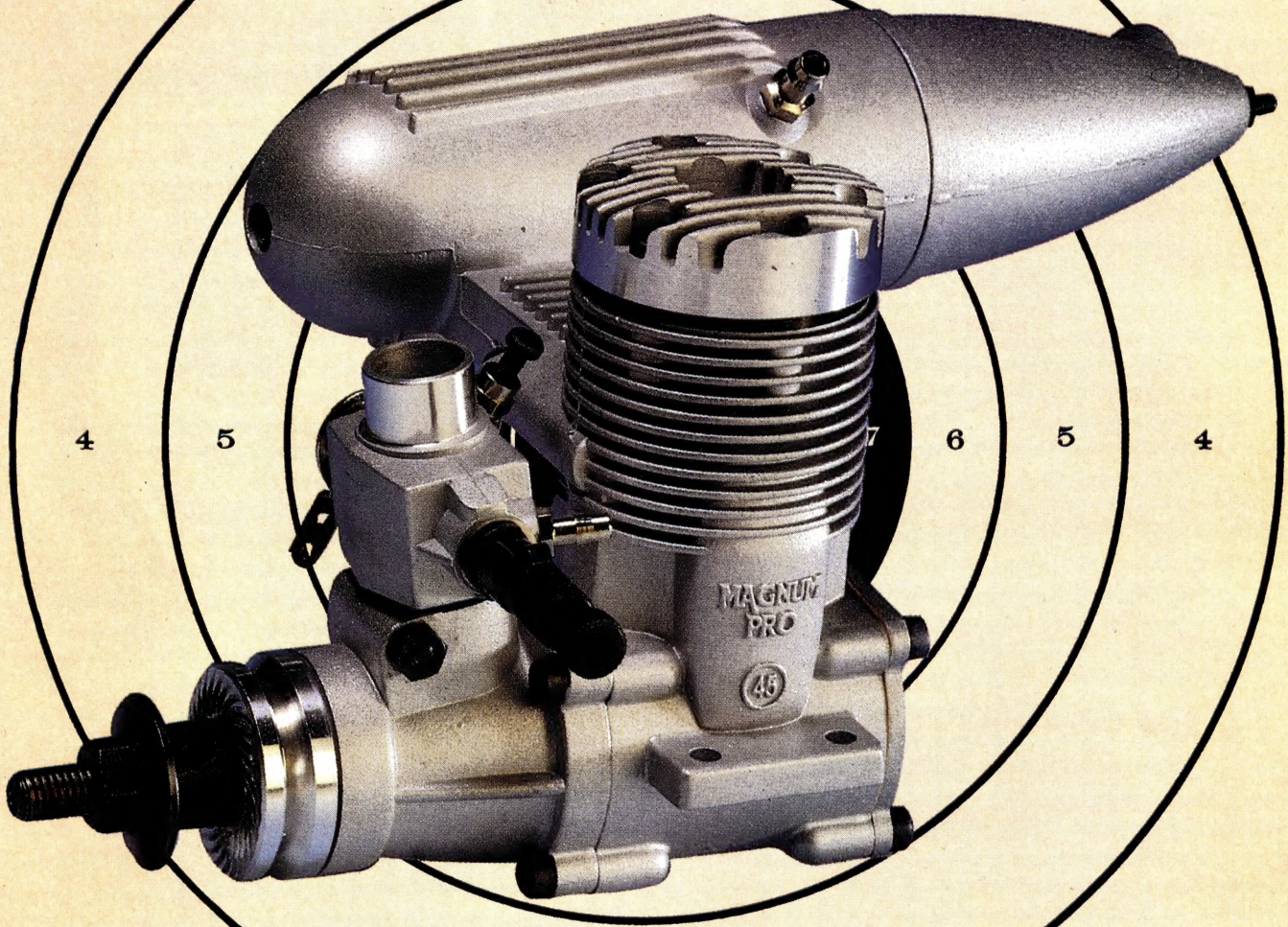

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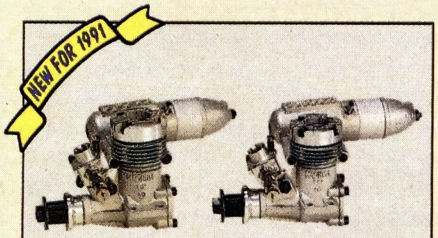

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